# POPULATION

JOURNAL
OF THE INTERNATIONAL UNION FOR THE
SCIENTIFIC INVESTIGATION OF
POPULATION PROBLEMS

AUGUST
1938

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LONDON
GEORGE ALLEN & UNWIN LTD
MUSEUM STREET

# POPULATION PHENOMENA IN AMSTERDAM

*By* DR. J. H. VAN ZANTEN *and* T. VAN DEN BRINK

## "MARRIAGES" (*continued*)

### RELIGION OF THE MARRYING. MIXED MARRIAGES

WE shall have to consider the figures relative to the religion of those marrying with some reserve. The records concerning sex, age, civil condition, etc., refer to objective data; the records concerning religion, on the other hand, emerge from oral statements of the persons marrying at the registration of their marriage, completed by what is known at the Registrar's about the religion of the person in question. Further, we must never forget that the data obtained in this way only give information about the clerical sect to which the persons marrying belong, but not about their religion. And the deviation which we will find in the figures must not be assigned to differences in religious feelings only.

It is obvious from the figures available that the marrying-frequency among the adherents of the different religions does not differ very much. Also between Jews and non-Jews no deviation of any importance exists, as will apear from the following computation for the years 1930 and 1931.

MARRIAGE-FREQUENCY PER 1,000 MARRIAGEABLES OF 20 YEARS AND OVER

| | Males | Females |
|---|---|---|
| Jews .. .. .. | 87 | 51 |
| Non-Jews .. .. .. | 87 | 64 |

The difference between Jewish and non-Jewish females is the consequence of the bigger female surplus among the Jewish population. (In 1930 there were 1,600 marriageable females among the Jewish population and 1,360 marriageable females among the non-Jewish population per 1,000 marriageble males of 20 years and over.)

It is of more importance to trace what is known about the religion-*combination* of the parties to the marriage, and especially about the cases where husband and wife contract a "mixed marriage."[1]

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[1] By "mixed marriages" in this statistical record, marriages are meant where the partners do not belong to the same group out of the four big

### MIXED MARRIAGES

| | For every 100 Marriages contracted in— | |
|---|---|---|
| | 1900–4 | 1926–30 |
| Religion of the Partners: | | |
| Both Protestant | 56·3 | 34·0 |
| Both Roman Catholic | 14·9 | 14·9 |
| Both Jewish | 8·5 | 7·3 |
| Both same religion | 79·7 | 56·2 |
| Different religion | 18·1 | 17·2 |
| Religion with "no religion" | 1·4 | 19·2 |
| Both "no religion" | 0·8 | 7·4 |
| | 100 | 100 |

The marriages where both partners belong to the same religion have declined considerably since the beginning of this century. The percentage decreased for this group from 80 to 56, especially as a consequence of the decrease of the purely Protestant marriages. On the other hand, we see a great increase of the marriages where neither husband nor wife belonged to any church, and a still greater increase of those where this is the case with only one of the partners. This change is not astonishing, if we pay regard to the strongly increased irreligiousness (in 1899, 6 per cent of the population of Amsterdam did not belong to a clerical sect; in 1930 this rate was 35 per cent) in the last decades, which took place mainly to the disadvantage of the Protestants. The mixed marriages where the partners belong to a different, but in any case to one of the three religions, continue to occur in nearly the same proportion (respectively 18 and 17 per cent).

Differentiating between Protestants, Roman Catholics, and Jews in respect of the relation between mixed and unmixed marriages, it appears that among Roman Catholics a great number of mixed marriages are contracted. In the period 1926–30, the yearly average of marriages between Roman Catholics was 944, against 1,318 marriages where only one of the partners belonged

groups, namely Protestants, Roman Catholics, Jews, and persons without religion. The last group contains all the persons who have stated that they do not belong to any *clerical sect*. Herewith, of course, no statement is given about the religious *feelings* of the persons of this group.

to this church; this means a ratio of 100 against 140. On the other hand, against 100 marriages between Protestants, 88 marriages took place where only one of the partners was Protestant, and against 100 marriages between Jews, 33 where only one of the partners was Jewish. These figures are strongly dependent on the possibility of marrying in one's own circle, or, more exactly, on the opportunity to meet people from another stratum of the population.

This appears also if we consider the marriages between persons of different Protestant denomination as mixed marriages. With a few exceptions, we see, then, that the clerical boundaries play a less important part in proportion to the smallness of the clerical sect. Although it is not certain whether we ought to speak of these marriages as really mixed marriages, this phenomenon is important; also this kind of mixed marriage, together with the others, are a great danger for the independent existence of the smaller clerical sects.

A few figures about the religion of the marrying in relation to their *age* follow.

It was evident from the earlier work[1] that among purely Jewish marriages those where both partners were minors outnumbered to some extent the other marriages. We are not entitled to infer from these numbers an indication that among Jewish young people more marriages are contracted than among non-Jews. If we compare the marriage-frequency among the marriageables in the different age-groups, taking into consideration the deviations in age-distribution, just the opposite appears to be the case.

ANNUAL AVERAGE OF PERSONS MARRYING IN THE PERIOD 1930–31 PER 1,000 MARRIAGEABLES OF EVERY SEX AND EVERY AGE-GROUP

| | MALES | | FEMALES | |
|---|---|---|---|---|
| | Jews | Non-Jews | Jews | Non-Jews |
| 20–29 years .. .. | 100* | 103* | 115* | 121* |
| 30–39 years .. .. | 129 | 121 | 51 | 57 |
| 40–49 years .. .. | 76 | 69 | 31 | 25 |

* Marriages under 20 years included.

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[1] *Population*, Vol. II, No. 3, p. 30.

Among Jewish males and also among Jewish females less marriages take place in the younger age-groups and more marriages take place among the older age-groups than among non-Jewish males and females.

From another computation of the religion of the partners in relation to their age there resulted, among other things, that among the "mixed marrying" more males and females of young age (under 25 years) figure than among the other marriages.

PER 100 MARRIAGES IN 1932 OF EVERY RELIGION-COMBINATION

| Religion of the Partners | Male under 25 Years* | Female under 25 Years* | Male and Female under 25 Years |
|---|---|---|---|
| Both Protestant .. .. .. | 29 (2·5) | 47 (12·2) | 23 |
| Both Roman Catholic .. .. | 27 (2·3) | 47 (9·9) | 20 |
| Both Jewish .. .. .. .. | 30 (3·3) | 53 (16·0) | 26 |
| Both "no religion" .. .. .. | 30 (2·7) | 53 (19·2) | 25 |
| Protestant with Roman Catholic .. | 34 (4·6) | 54 (20·6) | 29 |
| Protestant with "no religion" .. | 31 (2·7) | 56 (19·0) | 27 |
| Roman Catholic with "no religion" .. | 38 (5·6) | 59 (22·2) | 31 |

* Between brackets, under 21 years.

The fact that among marriages of Roman Catholics with Protestants and with persons not belonging to any clerical sect, persons younger than 20 figure most frequently is probably the consequence of the number of forced marriages. Later on, in the chapter on births, it will appear clearly that, especially in these mixed marriages, the first children are born within six months after the contraction of the marriage. Even if it is evident from the figures mentioned above that among the mixed marriages a relatively large number of marriages between young persons occurs, we are not entitled to deduce that in mixed marriages a smaller age-difference between husband and wife exists than in non-mixed marriages. The figures in the table on p. 7 prove that the opposite is the case.

For all mixed marriages the percentage where husband and wife are of the same age is lower than in the non-mixed marriages. This phenomenon would be even more strongly accentuated if, in the numbers for the mixed marriages, the forced marriages, which have been mentioned before and which more than the others are contracted at a younger age, could be left out of consideration. The bigger age-difference in mixed marriages appears also from the following.

Among the marriages contracted in 1932 and 1933 between males and females of the same age 41 per cent mixed marriages occurred, whereas this percentage for those where the husband is 15 years and more older than his wife was 51, and among those where the wife was 5 years or more older than the husband 45. We are quite safe in presuming that in proportion as the spouses differ in age (and especially in cases where the husband is considerably older) the decisive influence of religious factors will become less.

AGE-DIFFERENCE IN THE MARRIAGES CONTRACTED IN THE PERIOD 1932–33

PER 100 MARRIAGES OF EVERY RELIGION-COMBINATION

| | Male Older | | Male and Female same age | Female Older | |
|---|---|---|---|---|---|
| | 5 Years and more | 1–4 Years | | 1–4 Years | 5 Years and more |
| Non-mixed marriages .. | 26·4 | 38·5 | 19·0 | 12·4 | 3·7 |
| Mixed marriages .. | 28·5 | 39·3 | 16·9 | 11·5 | 3·8 |
| Purely Jewish marriages | 24·0 | 38·6 | 21·0 | 13·0 | 3·4 |
| Mixed Jewish marriages | 34·4 | 32·3 | 16·5 | 10·6 | 6·2 |

The analysis of the separately stated percentages for Jewish marriages shows us that for these groups the deviations between unmixed and mixed marriages are extremely large.

Finally, a single remark about the clerical solemnization of the marriages, after they have been contracted by the civil authorities.[1] This clerical solemnization becomes less and less usual. In 1900 it still took place after 62 per cent of the civil marriages; in 1930 this percentage had declined to 31.

Every 100 civil marriages between Protestants in the period 1926–30 were followed by 32 clerical solemnizations; for marriages between Roman Catholics this percentage was 76; for those between Jews, 94 per cent. For mixed marriages among which also those where only one of the partners belonged to a clerical sect it was only 8.

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[1] In the Netherlands it is obligatory to contract the civil marriage before the clerical solemnization may take place.

These figures, and especially those for the Protestants, demonstrate that, although people notify themselves as belonging to a certain clerical sect, the bonds with the church must be of a very loose nature.

## MARRIAGE BETWEEN RELATIVES

Since 1914 the marriages contracted between cousins, as well as between uncle and niece or nephew and aunt, are statistically registered. During the period 1914–30 the last two combinations occurred only 16 and 17 times respectively in more than 100,000 marriages contracted in Amsterdam during that period. Marriages between cousins are less rare; during the last years an average of 6 per 1,000 is recorded. They are more frequent among Jewish than among other marriages.

MARRIAGES BETWEEN COUSINS, PER 1,000 MARRIAGES BETWEEN:

| | Jews | Others | Total |
|---|---|---|---|
| 1914–20 | 23·8 | 7·8 | 9·2 |
| 1921–25 | 16·0 | 5·6 | 6·4 |
| 1926–30 | 16·9 | 5·1 | 5·9 |

It appears further that the records for the period 1914–20 are all vastly in excess of those for the later years. As for the years before 1914 no figures are available, it is not possible to trace whether these marriages are gradually less frequently contracted, or whether the high rates for 1914–20 were caused by accidental circumstances. This last supposition is likely to be true, when we see that the subsequent quinquennial periods do not return differences of any importance.

## RESIDENCE OF THE MARRYING POPULATION

We have already pointed out that, the Amsterdam marriage statistics being based on the marriages contracted in Amsterdam, non-Amsterdam people are also involved. This last category forms a fairly constant part of the marrying population, about 14 per cent.

PER 100 MARRIAGES CONTRACTED IN AMSTERDAM

| Residence of the Marrying | 1905–9 | 1926–30 |
|---|---|---|
| Both in Amsterdam .. .. .. .. | 85·7 | 86·4 |
| Husband only in Amsterdam .. .. | 3·0 | 2·6 |
| Wife only in Amsterdam .. .. .. | 11·3 | 11·0 |
| | 100 | 100 |

Marriages where only the wife belongs to the Amsterdam population occur more often than those where the opposite is the case. This is quite logical, if we take into consideration the practically general habit in the Netherlands to have the marriage contracted in the municipality where the bride is resident. Hence among the Amsterdam inhabitants married *outside* Amsterdam the *males* outnumber the females. This appears from the following calculation.

MARRIAGES IN THE NETHERLANDS IN WHICH AMSTERDAM PEOPLE WERE INVOLVED, CONTRACTED IN THE PERIOD 1926–30

| Residence of the Marrying | In Amsterdam | Elsewhere | Together |
|---|---|---|---|
| Both in Amsterdam .. .. .. | 27,329 | — | 27,329 |
| Husband only in Amsterdam .. | 811 | 3,347 | 4,158 |
| Wife only in Amsterdam .. .. | 3,479 | 651 | 4,130 |

It is further evident from these figures that during this period 31,487 Amsterdam men and 31,459 Amsterdam women married, of whom 86·8 and 86·9 per cent married with Amsterdam women and men respectively.

## "DIVORCES"

### INTRODUCTION, METHOD OF DETERMINING THE FREQUENCY

Whereas the figures concerning marriage show some stability, apart from temporary increases and decreases, the figures concerning marriage-*dissolution*, on the other hand, show a different aspect.

During the last fifty years the dissolutions of marriage by *death* of one of the partners gradually diminishes as a consequence of the regularly declining mortality-rates. On the other hand, the number of cases where *divorce* puts an end to the conjugal ties increases continually, in an absolute way as well as relatively, and at present in Amsterdam they represent a fifth part of the aggregate marriage-dissolution.

| | Dissolution of Matrimony per 1,000 Couples present* in Amsterdam | | | Dissolution by Divorce as Percentage of the Aggregate Dissolution |
|---|---|---|---|---|
| | By Death | By Divorce | Total | |
| 1880 | 34·3 | 0·7 | 35·0 | 1·9 |
| 1890 | 33·4 | 1·5 | 34·9 | 4·6 |
| 1898–1901 | 26·8 | 1·8 | 28·6 | 6·3 |
| 1908–11 | 24·9 | 2·3 | 27·2 | 8·5 |
| 1919–22 | 21·2 | 3·1 | 24·3 | 12·9 |
| 1929–32 | 20·3 | 4·2 | 24·5 | 20·5 |

* For the three first periods: *number of married males and females* present, divided by 2, respectively, on December 31, 1879, 1889, and 1899. Afterwards number of *couples*, respectively, on December 31, 1909, 1920, and 1930.

The data of the Amsterdam divorce statistics for the years before 1915 refer to the divorced couples of whom both, or one of the partners, had their *residence* in Amsterdam at the time of the divorce; from the year 1915 onwards, after a revision of the law, they refer to divorce of those whose *marriages* were *contracted* in Amsterdam. In consequence, the statistical records during the period after 1915 include a smaller number of cases. The difference varies, but might be fixed at 15 to 20 per cent.

The modified method did not change the fact that the Amsterdam divorce statistics also concern non-Amsterdam people. Before 1915 divorces of Amsterdam people where one spouse did not live in Amsterdam any longer were concerned; since 1915 divorces of couples married in Amsterdam of whom, at the moment of the divorce, one or both partners were not living in Amsterdam and who, consequently, were non-Amsterdam people. This difficulty can be avoided by referring the divorce statistics to the divorced persons individually, and by limiting them to the Amsterdam people involved in the divorces. In cases where only the *total* frequency is considered this has been done.

If, however, the divorce statistics are to be of any value for the study of the divorce problem, the further divisions into age-groups, religion, etc., must not only refer to the divorced persons individually, but to the relation in regard to each of these points of the *divorced* couples as such. Therefore it will be impossible to avoid the statistical records involving also non-Amsterdam people. Of course, the records could be limited to divorces of Amsterdam people, but in that case we should make mistakes in the opposite direction, because then the Amsterdam people who were married outside Amsterdam with non-Amsterdam people would not be taken into account.

Now the question can be put whether the computation of the frequency-rates is influenced by the circumstance that the divorced couples of the Amsterdam statistics, among whom figure many non-Amsterdam people, are brought into relation with all the purely Amsterdam couples present. In the marriage statistics, where the persons married in Amsterdam, among whom are also non-Amsterdam people, are put into relation with the aggregate marriageable Amsterdam people, this difficulty presents itself again, although to a less important degree. Analogically, we have to presume here that this factor has a negligible influence on the ratio of the frequency figures. It is, on the other hand, probable that by comparison of different *municipalities* specifically local differences will manifest themselves less clearly in the figures.

A second remark concerns the fact that in the case of a divorce we have to deal with the *legal*, the *formal* end of an unsuccessful marriage. And where by no means all the unsuccessful marriages end in a divorce, the divorce-rates are consequently not a true record of all the unsuccessful marriages. In a number of cases the formal tie continues to exist, although there is no longer any question of a marriage-bond in the ideal sense of the word. To the outer world this appears, for instance, by judicial separation, and also when, without there being question of such a separation, the partners do not live together any more. That this last-mentioned fact occurs frequently appeared from the Habitation and Family Census in Amsterdam, held in the year 1925. At that time, besides 2,083 and 3,051 divorced men and women, there were counted 3,824 married males and 4,630 married females who did not live any more together with their partners, and among those (estimated on the ground of the results of the statistical records derived from the census of 1920 and 1930) only 650 males and 800 females were judicially separated.

In appreciating the extent of the divorce-frequency and its variation locally and in time, we must not forget that the divorce records concern the cases where the marriage-bond is not only broken in an actual but also in a legal sense. Nevertheless, we are entitled to adjudge a representative value to the features of these records. Thus, when ratios occur which deviate from those among couples still married, one is allowed to presume factors of disturbing influence on the success of the marriage.

Another reserve, however, has to be made in this sense: "dass sich ja die Problematik der Ehescheidung rein zahlenmässig nicht darstellen lässt"[1] (that the problem of divorce cannot be represented merely by numbers). The divorce statistics confine themselves to compiling and grouping concrete positively determined data, such as age, religion, number of children of the divorced, the grounds on which the divorces have been pronounced, etc. We shall only get acquainted with the deeper reasons of the failure of so many marriages by tracing the signification for married life of each of these factors. But here we should come on a domain which lies beyond the statistical research work, and we should be led on to considerations which surpass the outlines of this article.[2]

A third remark touches the difficulties of the proper statistical investigation, which are more complicated, as regards this matter, than where it concerns *the contraction* of marriages. From the preceding chapter it appeared clearly enough how, for an exact comparison, we had constantly to eliminate disturbing elements, such as differences in age-distribution, civil condition, etc., and it was also evident that the features of the marriage records were properly displayed only if the *marrying* on the one side and the *marriageables* on the other side were put into relation with each other.

For the divorce records, which, as has just been stated, ought not to concern divorced individuals but divorced couples, this means a relation between divorced couples and the aggregate couples who are still married.

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[1] v. Auer, "Ein Jahrfünft Ehescheidungen in Breslau, 1926–30," *Monatsbericht des Statist. Amtes der Stadt Breslau*, August 1931.

[2] See for a social study on this matter, based on statistical records, among others, Cronjé, *Egskeiding en Huwelyks-en Gezinsontbinding* (*Divorce and Marriage- and Family-Dissolution*), Amsterdam, 1934.

However, records concerning married couples are almost entirely missing in the Netherlands. Fortunately, for Amsterdam, a division of couples is available as to the age of the partners at the time of three consecutive censuses, on December 31st of the years 1909, 1920, and 1930. Besides, for the last census, the number of couples, divided according to the number of children living in the family, is known for Amsterdam, and also for other municipalities. Thus the possibility of comparison is limited, and for this reason the *divorcing couples* have been compared in some subdivisions with *marrying* couples, instead of with *married* couples present. Such a comparison is of course not exact, for the marriages dissolved by a divorce in one special year have been contracted in the whole series of preceding years, and the marriage-ratios of these divorced people will never be quite comparable with those of the couples having been married in *one* preceding year. Moreover, marriages are not only dissolved by divorce, but also by death. And as, generally, marriages with a considerable difference in age of the two partners and marriages where the partners marry at an advanced age have a greater chance of dissolution by death than those where the opposite is the case.

## AMSTERDAM IN COMPARISON WITH OTHER MUNICIPALITIES

In the beginning of this chapter attention has already been drawn to the regular increase of the divorce-intensity, which can also be observed for the whole country.

ANNUAL RATE OF PERSONS IMPLICATED IN DIVORCE, PER 10,000 MARRIED PERSONS

| | Amsterdam | The Whole Country |
|---|---|---|
| 1900–09 | 20·5 | 7·6 |
| 1911–20 | 27·4 | 10·8 |
| 1921–25 | 34·9 | 14·6 |
| 1926–30 | 40·4 | 16·9 |
| 1930–31 | 44·5 | 18·0 |

It is not possible to assert to what extent the increase of the rates is the consequence of a steadily augmenting number of unsuccessful marriages. Although there are factors which point in this direction, one is obliged to take into consideration that nowadays, much more than formerly, people decide to a divorce as a solution of difficulties. In the last few decades public opinion about divorce and about divorced persons has changed considerably. Mowrer[1] even goes so far as to consider the increasing intensity as "probably chiefly the result of a changing attitude toward divorce." The augmenting divorce-frequency may indicate, not an increase in the dislocation of married life, as is so often asserted, but merely to the fact that this dislocation is, more than formerly, openly acknowledged, because the partners, more often than formerly, legally dissolve the conjugal knot, no longer existing in an ideal way.

The comparison of the figures for Amsterdam with those for the whole country points further to the fact that important differences between the separate municipalities must exist as to the extent of the frequency. It is evident from the following that this is really the case.

THE PERSONS IMPLICATED IN DIVORCE IN 1931 PER 10,000 MARRIED PERSONS AT DECEMBER 31, 1930

| Municipalities with— | |
|---|---|
| – 5,000 inhabitants .. .. | 3·9 |
| 5,000– 20,000 inhabitants .. .. | 6·7 |
| 20,000– 50,000 inhabitants .. .. | 12·9 |
| 50,000–100,000 inhabitants .. .. | 15·7 |
| 100,000 inhabitants– .. .. .. | 43·1 |

The difference between both extremes, in which we may see the contrast between the big towns and the rural districts, is very great indeed. The same conclusion that resulted from the comparison of the Amsterdam figures in the course of the years holds good here, i.e. we should not bluntly identify a lower frequency-rate with more favourable marriage-ratios, for, although the possibility exists that in rural districts the chances for conflicts in married life and failure of marriage are smaller, on the other hand, fewer unhappy marriages than in the big towns will result in a divorce in this part of the country, where people know each other more closely, where people judge and condemn each other, and where fear of public opinion is much greater. This is especially true if one has to deal with a purely agrarian population; for a more industrial rural population these ratios might approximate to those of the big towns.

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[1] Mowrer, *Family Disorganization*, Chicago, 1927.

A few figures, comparing Amsterdam with a number of foreign towns during the period 1926–30, follow.

ANNUAL AVERAGE OF DIVORCES ON 10,000 OF THE TOTAL POPULATION (1926–30)

| | | | |
|---|---|---|---|
| Hamburg | 19·9 | Cologne | 12·8 |
| Riga (1928–30) | 17·9 | Magdeburg | 12·4 |
| Budapest | 17·6 | Prague (1926–29) | 11·2 |
| Zürich | 17·0 | Breslau | 10·4 |
| Oslo | 15·2 | Dresden (1926–28) | 10·0 |
| Copenhagen | 14·6 | Brussels | 8·5 |
| Stockholm | 13·1 | **Amsterdam** | **8·1** |
| Bucarest | 13·0 | Lyons | 7·7 |
| Leipsic (1926–28) | 12·9 | Warsaw | 2·6 |

Although for Dutch ratios the Amsterdam number would appear rather high, in several foreign towns the divorce-frequency is higher, sometimes even considerably higher, than in Amsterdam.

However, as when studying the differences between the Dutch municipalities, we must not read into these relations the intensity of a more or less strong conjugal tie. The more so, as in several countries the divorce *legislation* is more liberal than in the Netherlands.[1]

In Italy and other countries, for instance, South America, where no legal separation is possible, divorces do not occur. The number of divorces is, on the other hand, very big in Russia, where marriage is (or was) considered as being a merely private matter, and where the State only occupies itself with the registration, and where divorce is considered to be only a question of signing off whenever one of the partners wishes it. For the cases lying in between, principally based on a larger or smaller number of grounds on which divorces can be petitioned or pronounced and the more or less complicated lawsuit procedure to be followed, it is difficult to trace the influence of the legislation on the divorce-frequency. At best for the period directly after a revision of the law. So we see, for instance, in Japan, after a stiffening of the legal regulations in question, a decrease of the number of divorces from 124,000 in 1897 to 99,000 in 1898 and 67,000 in 1899.[2] An example of more recent date and in opposite sense is supplied by Riga,[3] where after the war a simplification of the procedure and an extension of the number of grounds resulted in a great increase of the number of divorces. For the rest, it is difficult to judge the influence of legal measures in this domain. For the United States, Lichtenberger,[1] Cahen,[2] and other authors have elaborately studied this matter. They found in states with *unaltered legislation* a considerable increase of the divorce-rates, in states with an *entirely concordant legislation* big differences in these frequency-rates, and in states with *different legislation* no trace of a proportional ratio of the divorce-frequency.

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[1] Valkhoff, *Uitbreiding der echtscheidingsgronden* (*Increase of the Number of Grounds for Divorce*), Amsterdam, 1935.

[2] Numbers quoted from Cronjé, loc. cit., p. 123.

[3] "Riga's natürliche Bevölkerung, 1911–30," *Veröffentl. des Statist. Amtes der Stadt Riga, Neue Folge*, No. 12, Riga, 1932.

We see the same thing in the Netherlands, where the legislation has undergone no change, the divorce records rising regularly, and where between the municipalities, living under the same regulations, important differences exist. This proves that other factors besides the legislation are of importance, such as a changed mentality towards this problem; and it is uncertain whether these factors can be ruled by legal regulations and, if so, whether this influence will be durable. Already at the end of the last century Willcox[3] was of opinion that by restraining the number of grounds on which divorce may be obtained an increasing number of divorces on account of other grounds would take place. In the Netherlands, for instance, where divorce can be pronounced only on the ground of adultery, malevolent abandonment, ill-treatment, and imprisonment for a term of more than four years, the divorce procedure itself, by which divorce is pronounced if the respondent (male or female) does not appear before the judge, offers a possibility of which people very willingly make use if they want to make an end to their marriage. Generally adultery is accepted as being the ground, even if there is no question of infraction of conjugal faith; in that case the adversary does not appear before the tribunal, and thus the divorce is pronounced.

Hence the preceding divorce-rates only show to what extent *legal conjugal separation* took place. They are of no use in judging *conjugal relations*.

## DIVORCES IN THE SEPARATE YEARS

When we study the divorce-frequency in separate years, it appears that, apart from the tendency to increase, years of higher and lower frequency alternate.

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[1] Lichtenberger, *Divorce: A Social Interpretation*, New York, 1931.

[2] Cahen, *Statistical Analysis of American Divorce*, New York, 1932.

[3] Willcox, *The Divorce Problem: A Study in Statistics*, New York, 1897.

ANNUAL NUMBER OF AMSTERDAM PEOPLE WHOSE MARRIAGE IS DISSOLVED BY DIVORCE

(*Per* 10,000 *Married People*)

| | | | | | |
|---|---|---|---|---|---|
| 1911 | 21·2 | 1920 | 37·8 | 1929 | 43·5 |
| 1912 | 21·5 | 1921 | 34·8 | 1930 | 42·2 |
| 1913 | 25·7 | 1922 | 35·4 | 1931 | 46·6 |
| 1914 | 23·2 | 1923 | 34·9 | 1932 | 40·5 |
| 1915 | 26·9 | 1924 | 34·7 | 1933 | 41·4 |
| 1916 | 29·4 | 1925 | 34·6 | 1934 | 40·1 |
| 1917 | 27·6 | 1926 | 36·3 | 1935 | 39·9 |
| 1918 | 28·1 | 1927 | 40·6 | | |
| 1919 | 29·8 | 1928 | 39·0 | | |

After 1912 a quick rise follows, with a noticeable peak in 1920, after a relapse during the last war-years. In other countries the same fact may be noticed, especially in the belligerent countries, where the divorce-frequency had been very low during the war. This last phenomenon probably corresponds with the non-cohabitation of many married persons during this period, which mechanically induced the fact that grounds for divorce, such as ill-treatment, malevolent abandonment, etc., played a less important part, and the numerous dissolutions of marriage by death prevented those by divorce. The increase after the war in those countries is probably related to the fact that the *forced* separation during the war in many cases has proved to be too heavy a test for conjugal faith, which after the war led to a *real* separation; also it is not impossible that of the numerous marriages contracted immediately after the war many have been dissolved again after a short time.

In the Netherlands, the long-lasting condition of mobilization of the armed forces might have had an influence in the same direction.

Other circumstances, too, may be of influence. For instance, for the period 1923–25 the interruption of the increase is probably connected with the great housing shortage during those years, whereas the low rates for 1932–35 inclusive, respectively 40·5, 41·4, 40·1, and 39·9, after the peak in 1931 with 46·6 divorced persons per 10,000 married persons, will certainly be connected with the difficult economic situation. During a general decrease of the incomes people shrink from costs of lawsuits, financial consequences of the costs of maintenance, etc. It is not impossible that the decline of the divorce records which took place in 1908 (crisis in 1907) can be explained in the same way.

## Causes of the Divorces

The divorce statistics cannot give an insight into the more essential causes which have led to a failure of married life, and eventually to divorce. They are restricted to a survey of the actual grounds on which the judge has pronounced the divorce.

| Grounds | Divorces in the Period— | | | |
|---|---|---|---|---|
| | 1900–9 | | 1921–30 | |
| | Number | Per cent | Number | Per cent |
| I. Adultery .. .. .. | 1,542 | 80·5 | 4,941 | 92·9 |
| II. Malevolent abandonment .. | 337 | — | 303 | — |
| III. Ill-treatment .. .. .. | 17 | 18·7 | 14 | 6·1 |
| IV. Imprisonment for a term of more than 4 years .. .. | 5 | — | 6 | — |
| I and II .. .. .. .. | 13 | — | 39 | — |
| I and III .. .. .. .. | 2 | 0·8 | 14 | 1·0 |
| II and III .. .. .. .. | — | — | 1 | — |
| | 1,916 | 100 | 5,318 | 100 |

These figures do not give an image of reality, on account of the fact mentioned above, that very often fictitious adultery has been accepted as the ground for the divorce. As very often in these cases the husband allows the wife to act as the plaintiff, the preceding figures give no insight into the question whether the husband or the wife in most of the cases is the guilty partner in a divorce suit.

The number of divorces among these cases where adultery has been the real ground, is not known, neither is it known whether these cases occur more often nowadays than formerly.

The divorces on account of other grounds than adultery occur nowadays less often than formerly, not only relatively, but also in an absolute sense (grounds II, III, and IV, 323 against 359). Even if we take the mixed cases into account, there is no question of an absolute increase of these grounds (377 against 374).

## Duration of Married Life at the Moment of Dissolution by Divorce

In the divorce statistics of the Netherlands the lapse of time between the contraction of the marriage and the registration of the divorce counts as the duration of married life (which from now onwards we will call in this study "matrimonial duration"). The actual period of living together is shorter. In the interval between the pronouncing of the sentence and its registration, which, for Amsterdam, lasted three months on an average in 1932, the partners will no longer be living together. Generally this also holds good during the legal proceedings of the lawsuit, which very often take a considerable time. The cohabitation can also have been abrogated before, as, for instance, by divorces after a five years' judicial separation.[1]

From a table giving a summary of the formal matrimonial duration of the divorces registered during the years 1926–32, we see that the marriages which have lasted from 2 to 7 years inclusive, and more especially those from 3 to 6 years inclusive, occur most frequently. In these years after the contraction of the marriage the chance of a divorce is obviously the greatest.[2]

It is not possible to fix, on the ground of these figures, the *actual chance* of divorce of each matrimonial duration. In order to do so, we should have to compose a table of the matrimonial duration. This is only possible if we present the data respecting the matrimonial duration of the dissolved marriages, either by divorce or by death, and alongside those of the duration of all the existing marriages.

We can also compute these chances according to the direct method, the so-called method of Hermann, where the sequence of the marriages contracted in one special year is followed till they are all dissolved, but apart from practical difficulties by the computation (departure of families to other municipalities, etc.) the figures obtained in this way will only have a historical value, for we shall not be able to state the divorce-frequency among the marriages contracted in one special year till after some decades. Huber[3] calculated formerly for France, on the ground of the first-mentioned method, the dissolution-chances by death, as well as by divorce, for marriages of different duration. He showed a rapid increase of the divorce-frequency in the first years of married life, a maximum frequency after seven and eight years, and a gradual decline for marriages of longer duration.

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[1] These cases do not occur very often. During the period 1921–30, out of 5,327 divorces, only nine such cases.

[2] See *De Bevolking van Amsterdam*, Statistische Mededeelingen van het Bureau van Statistiek der Gemeente Amsterdam, No. 103, 1936, p. 48.

[3] Huber, "Table de durée des mariages en France, d'après le recensement de 1906, les décès et les divorces de 1906–1910," *Bulletin de l'Institut International de Statistique*, XX, 2, pp. 258 ff. See also Ida Rost, "Die Ehescheidungen der Jahre 1920–24 in Sachsen," Berlin, 1927.

In the Netherlands, and also in Amsterdam, no division as to matrimonial duration is known, either of the couples present or of the marriages dissolved by death, and hence a similar table cannot be computed. One can only state that the *divorce-frequency* increases quicker in the first years of married life than is shown in the table referred to, and that it decreases less quickly in the later years of married life than we can conclude from the declining figures in the same table.

How the matrimonial duration has altered in the course of the years appears from the following index-numbers.

INCREASE OF THE NUMBER OF DIVORCES AFTER A MATRIMONIAL DURATION OF:

| | 5 Years | 5–9 Years | 10–14 Years | 15–19 Years | 20 Years and longer |
|---|---|---|---|---|---|
| 1896–1900 | 100 | 100 | 100 | 100 | 100 |
| 1926–30 | 558 | 427 | 332 | 305 | 379 |
| 1916–20 | 100 | 100 | 100 | 100 | 100 |
| 1926–30 | 156 | 189 | 177 | 159 | 257 |

Since the beginning of this century (see the figures 1896–1900 to 1926–30) the divorces after a short matrimonial duration (up to 5 years), and also those after a matrimonial duration of 5–9 years, have increased more than the other groups, although we are also struck by the increase of divorces after a matrimonial duration of 20 years and longer. According to the figures of the last two lines of the table, the increase of this last group appears to have taken place especially in the last decade, and in 1931 the situation was such that in Amsterdam an average of one divorce of a couple married for more than 25 years was registered weekly. On the other hand, we have to take into account that the more favourable mortality-rate influences the augmentation of the *total* number of marriages of long duration, and that therefore the increase is not *entirely* the consequence of the higher divorce-frequency among these marriages. It would only be possible to trace to which degree the latter holds good if the above-mentioned tables for matrimonial duration for the different periods were available.

No alteration of any importance took place in the *average* matrimonial duration in general, as the divorces after short duration as well as those after longer duration have increased. For the year 1915 this average was 10·7 years; for 1930, 10·5 years.

It appears from the preceding lines that the divorce-frequency varies with the matrimonial duration, and we can put the question whether there exists a relation between these two; in other words, whether a short or long matrimonial duration is in itself a decisive factor at the moment on which the partners have decided to divorce. This is not probable, although there are perhaps cases where the long duration of married life is itself a reason for the partners to give up the idea of a divorce. Generally, however, the matrimonial duration is not an independent factor, and it is determined by other factors, such as age, marrying age, age-difference of husband and wife, the number of children, and such. It is not so easy to trace the influence of each of these factors on the matrimonial duration, as they are not independent of each other, neither of the matrimonial duration. Huber, in his study mentioned before, pointed to the fact that there is a relation between the matrimonial duration and the age at which both partners have married. This marrying age, in its turn, influences the extent of the age-difference, whereas the number of children of the divorcing will be dependent both on the matrimonial duration and on the marrying age. So, in order to get an insight in this question, it will be necessary to specify in the future divorce statistics in such way that the influence of this mutual dependence can be eliminated. But not only the divorce statistics. Without the possibility of comparing the divorced couples with all the married couples we shall not be able to advance in this matter.

Between the different big Dutch municipalities no important deviations in regard to the matrimonial duration exist. A few figures comparing Amsterdam with other towns follow.

We see that in the small towns divorces after less than 5 years of married life occur proportionately less frequently. Divorces after 5 to 19 years occur in almost equal proportion, and those after 20 years and longer more frequently than in the big towns. However, we are not entitled to deduce from this that in the small communes longer-lasting matrimonies come sooner to a divorce than in the big towns. We shall have to explain the ratio of these percentages as follows: The much higher total divorce-frequency in the big towns is mainly the consequence of a preponderant number of divorces after a short matrimonial duration, in consequence of which fact in these municipalities the divorces after long matrimonial duration are relatively fewer in number than in the small communes. Also an unequal ratio of the matrimonial duration of all the married couples *present*, due to marriage at an earlier age in the big towns, the settlement of young couples, and such like, can influence the deviations between the different municipalities. It cannot be stated to which extent this last supposition is really true. In the Netherlands there is no division made of all the married couples as to the matrimonial duration, and hence it is not possible to calculate comparable frequency-rates for divorces of marriage of different duration in each of the municipalities or groups of municipalities.

OF 100 DIVORCES IN THE PERIOD 1926–30 THE MATRIMONIAL DURATION WAS:

| | 5 Years | 5–9 Years | 10–14 Years | 15–19 Years | 20 Years and longer | Total |
|---|---|---|---|---|---|---|
| Amsterdam .. | 25·7 | 29·8 | 19·4 | 10·9 | 14·2 | 100 |
| Five big towns | 26·9 | 30·8 | 18·2 | 11·1 | 13·3 | 100 |
| Towns with less than 20,000 inhabitants | 22·8 | 29·5 | 18·6 | 10·9 | 18·2 | 100 |

Also the comparison between the following figures, referring to foreign towns, breaks down on account of these difficulties. Nevertheless, it is evident from further manipulations that in the towns quoted here divorces after a matrimonial duration of less than ten years occur more frequently than in Amsterdam. The figures in the last line of the table, which represent the number of divorces within one year after the marriage per 1,000 *contracted marriages in the same period*, show that also in this regard the Amsterdam rate may be considered favourable. In Bucarest especially the divorce-intensity among newly contracted marriages is very high.

DIVORCES IN 1928–30 GROUPED ACCORDING TO THE DURATION OF MARRIED LIFE

| Matrimonial Duration | Amsterdam | Bucarest* | Budapest | Prague, 1926–29 | Hamburg | Leipsic, 1927–29 | Cologne, 1927–29 | Magdeburg | Breslau, 1926–29 | Zürich | Riga | Oslo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| –1 year .. .. | 1·2 | 20·5 | 24·8 | 2·5 | 0·9 | 0·8 | 0·5 | 22·3 | 0·3 | 35·2 | 3·1 | 3·2 |
| 1–4 years .. | 24·5 | 42·3 | | 29·6 | 24·7 | 28·6 | 22·6 | | 22·9 | | 23·7 | 21·9 |
| 5–9 years .. | 29·8 | 24·3 | 36·0 | 37·6 | 38·0 | 37·1 | 37·7 | 37·8 | 39·5 | 32·1 | 31·4 | 49·4 |
| 10–14 years .. | 19·4 | 7·1 | 24·6 | 12·3 | 15·9 | 13·0 | 15·6 | 16·9 | 15·6 | 14·9 | 15·6 | |
| 15–19 years .. | 10·9 | 3·6 | 7·6 | 8·4 | 9·1 | 8·9 | 10·5 | 9·8 | 9·8 | 8·9 | 11·5 | 19·2 |
| 20–24 years .. | 6·6 | 1·6 | 3·4 | 4·8 | 6·4 | 11·6 | 6·2 | 6·0 | 11·9 | 5·4 | 7·1 | |
| 25 years and more .. | 7·6 | 0·6 | 3·6 | 4·8 | 5·0 | | 6·9 | 7·2 | | 3·5 | 7·6 | 6·3 |
| Total .. | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Up to 10 years | 55·5 | 87·1 | 60·8 | 69·7 | 63·6 | 66·5 | 60·8 | 60·1 | 62·7 | 67·3 | 58·2 | |
| *Divorces in the First Year of Married Life on 10,000 Contracted Marriages* | | | | | | | | | | | | |
| | 9·3 | 255·0 | | 58·0 | 17·0 | 11·2 | 6·2 | | 4·0 | | 47·9 | 42·4 |

* 1 year, 1–5, 6–9, 10–15, 16–20, 21–24, 25 years and more.

## Age of the Divorcing Couples at the Date of their Marriage and at the Time of their Divorce, and their Age-difference

A few figures concerning the *age* of the separating partners follow below. The material obtained from the census in Amsterdam made it possible to calculate the divorce-frequency for the periods around the censuses of 1909, 1920, and 1930, each time per 10,000 couples of the same age-combination.

### ANNUAL AVERAGE OF DIVORCED PERSONS IN EACH PERIOD AMONG 10,000 MARRIED COUPLES IN EVERY AGE-COMBINATION

| Age of Husband | Age of Wife | | | | |
|---|---|---|---|---|---|
| | 30 Years | 30–39 Years | 40–49 Years | 50 Years and Older | Total |
| | | | *1929–32* | | |
| 30 years .. .. | **58·1** | 75·1 | 270·3 | — | 60·4 |
| 30–39 years .. | 70·3 | **47·4** | 55·9 | 79·4 | 53·5 |
| 40–49 years .. | 129·8 | 54·7 | 34·1 | 34·3 | 41·5 |
| 50 years and older | 266·7 | 114·3 | **30·3** | **13·1** | 18·9 |
| Total .. .. | 64·7 | 51·9 | 35·3 | 14·8 | 40·5 |
| | | | *1916–25* | | |
| 30 years .. .. | **46·4** | 48·1 | 96·8 | 250·0 | 46·8 |
| 30–39 years .. | **45·2** | **37·7** | 63·3 | 114·0 | 39·6 |
| 40–49 years .. | 61·7 | 41·4 | **23·1** | 27·0 | 29·1 |
| 50 years and older | 73·5 | 63·4 | 24·6 | **8·1** | 12·5 |
| Total .. .. | 46·4 | 39·8 | 24·9 | 9·9 | 29·8 |
| | | | *1905–14* | | |
| 30 years .. .. | **27·1** | 30·7 | 62·5 | — | 27·8 |
| 30–39 years .. | 35·0 | **27·6** | 31·9 | 58·8 | 29·8 |
| 40–49 years .. | 67·0 | 29·2 | **17·0** | 23·8 | 21·8 |
| 50 years and older | 151·5 | 54·4 | 18·4 | **7·4** | 10·7 |
| Total .. .. | 30·6 | 28·8 | 19·0 | 8·9 | 21·7 |

In comparing the total figures for males and females in every age-group during the period 1929–32 with the analogous frequency-rates for 1905–14, it is obvious that the divorce-frequency has increased most for the group under 30 years, and, as appears further from the following numbers, especially for the group 25–29 years inclusive.

ANNUAL AVERAGE OF DIVORCED PERSONS PER 1,000 MARRIED PERSONS, IN EVERY AGE-GROUP

(*On the basis of the rates for 1905–14 = 100*)

| | 25 Years | 25–29 Years | 30–34 Years | 35–39 Years | 40–49 Years | 50 Years and Older |
|---|---|---|---|---|---|---|
| | | | *Males* | | | |
| 1905–14 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1929–32 | 182 | **228** | 184 | 175 | 189 | 177 |
| | | | *Females* | | | |
| 1905–14 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1929–32 | 206 | **214** | 188 | 172 | 186 | 166 |

These figures agree with the fact already stated, that during the last decades especially the number of divorces after short matrimonial duration has augmented, although naturally a divorce after short duration does not always signify a divorce of a young couple.

When we examine the *combined* age of husband and wife more closely, we see, with a few exceptions, the lowest frequency-rates among couples where husband and wife belong to the same age-group and a rising frequency with increasing age-difference.

It is *not* evident from these figures what is the influence of the age at which the divorcing partners have *married*. There is in this regard no comparison possible with all the married *couples* present. In order to get some idea on this point, we have worked out the table on p. 26, where the marrying age of the divorced couples in 1931 and 1932 has been put by the side of the marrying age of the *marrying couples* during the preceding period 1926–30.

From these figures it appears first of all that, although among the divorced couples a higher rate of couples married at a younger age could be expected (from the marriages contracted at an older age some will be already dissolved by *death*), the difference between the proportion of the *divorcing* couples where both partners were married before the age of 25 (38·4 per cent) and that of the *marrying* couples, both partners under 25 years

(25·6 per cent), is so great that we are justified in presuming a bigger divorce-chance for couples marrying at a young age, and,

### A. DIVORCES

Age-combinations of the Partners divorced in the Years 1931 and 1932 at the time of their Marriage per 1,000 couples

| Age of Husband | Age of Wife | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 Years | 25–29 Years | 30–34 Years | 35–39 Years | 40–49 Years | 50 Years and Older | Total |
| –25 years | 383·7 | 49·8 | 8·0 | 2·4 | 3·2 | — | 447·1 |
| 25–29 years | 187·8 | 77·9 | 28·9 | 9·6 | 3·2 | — | 307·4 |
| 30–34 years | 36·9 | 35·3 | 22·5 | 8·8 | 4·8 | — | 108·3 |
| 35–39 years | 23·3 | 8·8 | 10·5 | 3·2 | 8·0 | 0·8 | 54·6 |
| 40–49 years | 7·2 | 14·4 | 8·0 | 13·7 | 8·9 | 7·2 | 59·4 |
| 50 years and older .. | — | 3·2 | 1·6 | 3·2 | 7·2 | 8·0 | 23·2 |
| Total .. | 638·9 | 189·4 | 79·5 | 40·9 | 35·3 | 16·0 | 1,000 |

### B. MARRIAGES

Age-combinations of the Partners per 1,000 Marriages contracted during the Period 1926–30

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25 years .. | 255·8 | 43·6 | 5·2 | 0·9 | 0·2 | — | 305·8 |
| 25–29 years | 202·6 | 146·6 | 27·6 | 5·4 | 1·2 | — | 383·4 |
| 30–34 years | 39·2 | 55·7 | 31·4 | 9·6 | 3·3 | 0·2 | 139·4 |
| 35–39 years | 9·3 | 15·1 | 18·4 | 10·3 | 5·2 | 0·4 | 58·7 |
| 40–49 years | 3·5 | 8·1 | 13·3 | 15·1 | 17·9 | 3·6 | 61·5 |
| 50 years and older .. | 0·5 | 1·7 | 2·9 | 5·3 | 17·5 | 23·4 | 51·2 |
| Total .. | 510·9 | 270·8 | 98·8 | 46·6 | 45·3 | 27·6 | 1,000 |

A. Per 1,000 Divorces in 1931 and 1932

| Age of Husband | Age of Wife | |
|---|---|---|
| | –20 Years | 20–24 Years |
| –20 years | 35·3 | 12·0 |
| 20–24 years | 112·4 | 224·0 |

B. Per 1,000 Marriages in the Period 1926–30

| Age of Husband | Age of Wife | |
|---|---|---|
| | –20 Years | 20–24 Years |
| –20 years | 7·7 | 4·6 |
| 20–24 years | 60·4 | 183·1 |

as will be evident from the further division in this group, this presumption can be made especially for the marriages contracted at a very young age. Among 1,000 divorcing couples there are 35 where husband and wife married before their twentieth year, among 1,000 marrying couples only 8.

With regard to the age-*difference* more positive conclusions may be drawn. If this age-difference had no influence among the divorced couples, those where husband and wife belong to different age-groups would, owing to deaths, occur less often than among the aggregate marrying couples; but among the divorced, just in those cases where the wife, at the time of the marriage, belonged to a higher age-group, and also in those where the husband was ten years or more older, the percentages are higher than among the aggregate marrying population (on the ground of the small absolute numbers, the deviations in the cases where the husband is 30–34 and the wife 35–39, and those where the husband is 50 years or older and the wife 30–34, have to be considered as being of accidental nature). From the following summary of the preceding figures we are entitled to conclude that the divorce-chance in marriages where the husband is younger than the wife is greater than in those marriages where the opposite is the case.

| | Divorces in 1931–32 | Marriages in 1926–30 |
|---|---|---|
| Husband of older age-group .. .. .. | 47·9 | 50·8 |
| Husband and wife of same age-group .. | 37·3 | 37·5 |
| Husband of younger age-group .. .. | 14·8 | 11·7 |
| Total .. .. .. .. .. | 100 | 100 |

It would be more exact if we did not determine the age-difference on the ground of the division of the age in groups of years, but if we worked with the *real* age-difference. This is done for the period 1926–30, in which period in 18 per cent of the divorces husband and wife differed less than one year in age, in 63 per cent of the cases the husband was more than one year older, and in 19 per cent of the cases he was more than a year younger than his wife. In the table below the analogous figures for 1931–32 are put by the side of a similar division of the aggregate marrying couples, which division, however, was only available from 1932 onwards.

| | Divorces in 1931–32 | Marriages in 1932 |
|---|---|---|
| Husband older 15 years and more | 4·5 | 3·1 |
| Husband older 10–14 years | 4·6 | 4·8 |
| Husband older 5–9 years | 16·9 | 18·9 |
| Husband older 1–4 years | 37·4 | 39·7 |
| Husband older 1 year<br>Husband younger 1 year | 16·7 | 17·0 |
| Husband younger 1–4 years | 12·8 | 12·6 |
| Husband younger 5–9 years | 5·1 | 3·1 |
| Husband younger 10–14 years | 1·4 | 0·6 |
| Husband younger 15 years and more | 0·6 | 0·2 |
| Total | 100 | 100 |

It is evident from this table that the relative difference between the percentages of the divorcing and of the marrying are the highest where the age-difference is greatest. And further, when the husband is younger than the wife it is greater than when the opposite is the case.

As the age at which people marry is of influence on the age-difference, and as the marrying age of divorcing persons and marrying persons is not the same, the above-mentioned ratios have also been traced for divorcing and marrying males of the *same* marrying age.

MARRYING-AGE OF *DIVORCING* MALES (1931–32) AND *MARRYING* MALES (1932)

| Age-difference | 21–24 Years | | 25–29 Years | | 30–34 Years | |
|---|---|---|---|---|---|---|
| | Divorcing Males | Marrying Males | Divorcing Males | Marrying Males | Divorcing Males | Marrying Males |
| Husband older 10 years and more | — | 0·1 | 0·7 | 0·6 | 17·5 | 8·8 |
| Husband older 5–9 years | 5·5 | 4·3 | 29·5 | 20·3 | 31·0 | 35·4 |
| Husband older 1–4 years | 52·4 | 49·5 | 38·4 | 46·7 | 20·6 | 31·0 |
| Husband older 1 year<br>Husband younger 1 year | 22·1 | 24·1 | 11·0 | 17·0 | 13·5 | 10·6 |
| Husband younger 1–4 years | 14·0 | 17·5 | 13·6 | 11·9 | 7·1 | 9·4 |
| Husband younger 5–9 years | 4·6 | 3·9 | 4·2 | 2·8 | 7·9 | 3·7 |
| Husband younger 10 years and more | 1·4 | 0·6 | 2·6 | 0·7 | 2·4 | 1·1 |
| | 100 | 100 | 100 | 100 | 100 | 100 |

For these rates, too, like for the preceding ones, the deviations go in the same direction. From this we may conclude that not only marriage at a very young age, but also a great age-difference between husband and wife, especially when the latter is older than her husband, renders greater the chance for divorce. It is especially in these marriages, more than in others, factors seem to arise which lead to estrangement and eventually to divorce. We will not go into details about the *nature* of these factors which lie outside the dominion of the statistics.

For the sake of completeness, a few data about the average age of the divorcing persons at the time of their divorce and their marriage may follow for the year 1932.

| | Males | Females |
|---|---|---|
| | Years | Years |
| Average age— | | |
| of the divorced persons at the time of their divorce .. .. .. .. .. .. | 39·1 | 36·1 |
| of the divorced persons at the time of their marriage .. .. .. .. .. | 27·7 | 24·9 |
| of the marrying persons .. .. .. .. | 29·6 | 26·4 |
| of the remarrying divorced persons among them .. .. .. .. .. .. | 38·6 | 35·5 |

For the divorcing males the difference between the means is 11·4 years, for females 11·2 years, which corresponds with the average matrimonial duration of 11·3 years of the couples divorced in 1932.

We must not attribute too great a value to the fact that the average marrying age of the divorcing proves to be lower than that of the aggregate married persons. It is possible that this difference is the consequence of the higher divorce-frequency, which has been stated for the marriages contracted at a young age, but also the unexactness, already mentioned several times before, of a comparison between divorcing and marrying persons can be of influence here.

The average age of divorcing persons proves further to be higher than that of *remarrying* divorced; this may point to the fact that among the divorced persons the younger people, more than those of an older age, proceed to a new marriage.

### Number of Children of Divorced Couples

In most of the divorce statistics data can be found about the number of children of the divorced couples. In the Netherlands, too, this division is made, namely, according to the number of minor children at the time of the divorce. In order to judge these figures, the results of the statistical records, mentioned before, derived from the census and concerning the number of families present, classed as to their size, are at our disposal, at least for the year 1930. However, the division given in these records of all the couples present has not been made according to the number of minor children, but according to the number of children still living in the family. Among these also adult children will be found. Still, for want of something better, these data have been made use of below.

ANNUAL AVERAGE OF COUPLES DIVORCED DURING THE PERIOD 1929–32 OF 10,000 COUPLES ON DECEMBER 1930, IN EVERY GROUP

| | |
|---|---|
| Without minor children .. .. .. .. | 67·1 |
| With 1 minor child .. .. .. .. .. | 43·5 |
| With 2 minor children .. .. .. .. | 32·1 |
| With 3 minor children .. .. .. .. | 28·1 |
| With 4 minor children .. .. .. .. | 22·5 |
| With 5 and more minor children .. .. .. | 17·1 |
| Total with minor children .. .. .. .. | 33·0 |

We see that among couples without any children rather more than twice as many divorces occur as among couples with children (67·1 per ten thousand against 33·0 per ten thousand). It is further obvious that the divorce-frequency declines with the number of children.

We see that the divorce-frequency is influenced by the *presence* or the *absence* of children and also by the *number* of children. It is not possible to lay down statistically to which extent the affection for the children, the sense of responsibility for their further education, the influence of their presence on the bond between the parents, and suchlike factors, play a part. This holds also for the question whether in childless marriages the childlessness itself may be considered as a cause for the high divorce-frequency in this group, as, for instance, Gargas[1] supposes.

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[1] Gargas, "Echtscheiding in Nederland" ("Divorce in the Netherlands"), *Opbouw*, 1928–29, pp. 49 ff.

To what extent the number of children has had, in the course of the years, a greater or a smaller influence on the increase of the number of divorces may appear from the comparison of the following percentages for the period 1926–30 with those for the years 1896–1900.

| | Per 100 Divorced Couples | | Percentage Increase of the Absolute Number in each Group since 1896–1900 |
|---|---|---|---|
| | 1896–1900 | 1926–30 | |
| Divorced couples: | | | |
| Without minor children .. | 53·1 | 42·5 | 224 |
| With minor children .. | 46·9 | 57·5 | 393 |
| | 100 | 100 | |
| Divorced couples with minor children: | | | |
| With 1 child .. .. .. | 41·5 | 46·2 | 449 |
| With 2 children .. .. | 25·4 | 30·2 | 488 |
| With 3 children .. .. | 15·3 | 13·0 | 319 |
| With 4 children .. .. | 8·6 | 5·5 | 213 |
| With 5 children and more .. | 9·2 | 5·1 | 175 |
| | 100 | 100 | |

It is noticeable that the percentage of divorces without minor children has gone down from 53 to 42, that in this period the absolute number of these divorces has increased by 224 per cent, and also that the number of divorces of couples *with* children has increased by no less than 393 per cent (see last column of the table). Just the opposite might have been expected. Among the aggregate families present the diminution of the birth-rate must have made the number of couples without minor children to increase, whereas in the course of the years the number of divorces after short matrimonial duration, that is, those cases where a relatively greater number of families without children can be presumed, has increased with more intensity than the number of divorces after long matrimonial duration. To explain this unexpected trend of the figures several ways are open to us. In the first place there is the suggestion of Gargas.[1] The relative decline in the number of divorces without children would be, according to Gargas, the consequence of the fact that, more than formerly, "the desire to have a child has been suppressed and that the matrimony is continued in spite of childlessness and without children." It is more probable, however, that the cause must be looked for in opposite direction. It is also possible to see the change as a relative increase of the divorces of couples with children, and this increase ought then, just as the increase of the divorce-frequency in general, to be considered as a phenomenon of our modern times, in which the family bonds grow more and more lax and in which the children, less than formerly, form an obstacle for the parents to proceed to divorce.

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[1] Gargas, "Echtscheiding in Nederland" ("Divorce in the Netherlands"), *Opbouw*, 1928–29, pp. 49 ff.

We are not allowed to judge without any further investigation the change between the percentages for divorced couples with minor children, no more than the deviating increase-rates in the last column of these groups. In the course of the years, indeed, the ratio among the aggregate couples present as to the number of their children has altered. To what extent, however, is not known.

In the above we have stated that the divorce-frequency was lower in proportion to the greater number of children. The last cases in general refer to matrimonies of longer duration, and hence the question may arise whether also this longer *duration of married life* is of influence here. For this reason the percentages have also been worked out for divorces after different matrimonial duration, so for the years 1931 and 1932, where the group 20–24 years has been divided, as there is here question about minor children.

DIVORCED COUPLES

| Matrimonial Duration | Without Children, Percentage of Divorced Couples of each matrimonial duration | Percentage of the Divorced Couples with Children | | | |
|---|---|---|---|---|---|
| | | With 1 Child | 2 Children | 3 Children | 4 and More Children |
| 0–4 years | 56·3 | 79·4 | 16·8 | 3·8 | — |
| 5–9 years | 44·7 | 54·9 | 27·4 | 11·2 | 6·5 |
| 10–14 years | 30·6 | 34·3 | 34·9 | 13·2 | 17·7 |
| 15–19 years | 22·2 | 23·5 | 31·9 | 22·7 | 21·9 |
| 20 years | 8·7 | 14·2 | 28·6 | 28·6 | 28·6 |
| 21–24 years | 24·7 | 20·0 | 38·2 | 20·0 | 21·8 |
| 25 years and longer | 59·7 | 42·1 | 31·6 | 15·8 | 10·5 |
| Total | 41·3 | 45·1 | 29·1 | 13·5 | 12·3 |

As a matter of fact, important deviations appear to exist. The mutual relations of these figures, however, are strongly influenced by the ratios of the aggregate married couples. Among the latter also, just as in the preceding rates, the percentage of couples without children will decline with the increase of the matrimonial duration, and if we only reckon with the minor children, like we did with the divorced couples, the percentages for marriages which lasted twenty years and longer will *increase*. Here, too, we cannot deduce much from the differences between the features for the divorced couples only.

From a study of the table of the matrimonal duration of the divorces registered during the years 1926–32, it is seen that the regular decrease of the number of divorces after a matrimonial duration of more than seven and eight years becomes less strong for matrimonial durations of twenty years and longer. Undoubtedley we here deal with divorces which have been postponed until the children have grown up. In spite of the fact that at that moment the marriage has lasted for such a long time, the parents nevertheless decide to divorce.

Finally a comparison between Amsterdam and a few foreign towns during the period 1928–30 may follow.

The comparison is still more difficult here, as not always, as in Amsterdam, is the number of *minor* children stated. Sometimes the number of the *aggregate born children* is given, sometimes that of the *aggregate living* children. The fact that, nevertheless, the percentage of divorced couples without children is lower in Amsterdam than in the other towns mentioned here may be the consequence of a relatively greater number of divorces after short matrimonial duration in the other municipalities, which has been indicated by the figures on page 23. Besides, in these municipalities in general, more couples without children may be found. If this is really the case, we will find rather there than in Amsterdam proportionately more couples with few children than with many children, which fact, in its turn, influences the ratio of *divorced* couples with few and with many children. Therefore we shall also have to contemplate the percentages referring to this last ratio with much reserve, and we are not entitled to deduce without further examination that in Amsterdam, among couples with respectively two, three, and four children, etc., more divorces occur than in other towns.

| | Amsterdam* | Prague, 1926–29† | Budapest† | Zürich† | Magdeburg* | Leipsic, 1927–28‡ | Hamburg‡ | Cologne, 1927–29‡ | Breslau, 1926–29‡ | Riga‡ |
|---|---|---|---|---|---|---|---|---|---|---|
| Divorced couples: | | | | | | | | | | |
| Without children . . | 43·9 | 45·9 | 64·3 | 50·1 | 48·3 | 49·2 | 50·3 | 45·3 | 46·3 | 56·9 |
| With children . . | 56·1 | 54·1 | 35·7 | 49·9 | 51·7 | 50·8 | 49·7 | 54·7 | 53·7 | 43·1 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Divorced couples with children: | | | | | | | | | | |
| 1 child . . . . | 46·2 | 78·1 | 69·3 | 58·3 | 60·5 | 53·2 | 57·1 | 55·9 | 56·4 | 66·9 |
| 2 children . . | 30·1 | 19·1 | 22·8 | 27·6 | 39·5 | 26·4 | 28·2 | 28·2 | 27·2 | 23·1 |
| 3 children . . | 12·9 | 2·0 | 5·8 | 14·1 | | 11·5 | 9·2 | 8·7 | 10·4 | 7·1 |
| 4 children . . | 5·6 | 0·6 | 1·4 | | | 3·8 | 3·4 | 4·4 | 3·5 | 2·2 |
| 5 and more children | 5·2 | 0·2 | 0·7 | | | 5·1 | 2·1 | 2·8 | 2·5 | 0·7 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

* Minor children. † The aggregate born children. ‡ The aggregate living children.

## RELIGION OF THE DIVORCING COUPLES

In order to trace if there exists any relation between the religion and the number of divorces, we should have to be able to compare the number of divorcing couples with an analogous division of the aggregate couples present, which is not available. Hence the only comparison possible is that with the religion of the aggregate *marrying* couples. As the couples divorced in the years 1926–30 have married for the greater part in the preceding 3–7 years (the divorces take place especially within the period of 3–7 years after the marriage), the comparison in this, and in the following table, has been made with the period 1921–25.

| Religion | Per 100 Divorced Couples, 1926–30 | Per 100 Marrying Couples, 1921–25 |
|---|---|---|
| Both Protestant .. .. .. | 35 | 41 |
| Both Roman Catholic .. .. | 11 | 15 |
| Both Jewish .. .. .. | 6 | 8 |
| Both "no religion" .. .. | 10 | 4 |
| Both different religion .. .. | 38 | 32 |
| | 100 | 100 |

In studying these figures, a contrast is immediately evident between marriages where both partners belong to the same religion and those where this is not the case, or where they do not belong to any religion. The last two groups form respectively 32 and 4 per cent of the aggregate marrying couples and 38 and 10 per cent of the aggregate divorcing couples, which points to a higher divorce-frequency among those groups.[1]

This is still more obvious if we try to lay down a relation between marrying and divorcing persons of the same religion-combination.

Out of these figures we are allowed to presume that the relative frequency of divorce among purely Protestant, Roman Catholic, and Jewish marriages is smaller than among the mixed marriages,

[1] May, "Mischehen und Ehescheidungen," *Schmollers Jahrbuch*, Band 53 (1929), p. 383 ff., finds for Hamburg, for which town he had at his disposal a division of the aggregate couples present according to their religion, also a higher divorce-frequency among mixed than among unmixed marriages, and a still higher rate among marriages of persons without any religion. T. Szel comes to the same conclusion ("Les mariages mixtes," *Revue Hongroise de Statistique*, 1933, pp. 705 ff.).

and that the relative frequency of divorce is very high for marriages where none of the partners belongs to any religion.

In connection with the last-mentioned fact it is remarkable that among *mixed* marriages, also for those where one of the partners does not belong to any religion, these percentages outnumber the other rates. The second place is occupied by the marriages where one of the partners is Jewish, whereas for mixed marriages between Protestants and Roman Catholics the rates are the most favourable.

It is not so easy to trace to what extent the differences between the various groups are the consequence of a more or less strong influence of religious feelings and clerical regulations, nor is it possible to say whether the high frequency among the mixed marriage has to be attributed to a disagreement of religious opinions. Generally speaking, we must be sceptical about this last supposition. Not only on the ground of the fact that in cases where people contracted a mixed marriage we are entitled to surmise that religious feelings do not play an important part, but also on statistical grounds. The *marriage* statistics show that among the mixed marriages many marriages occur which have been contracted at an early age, whereas also the *age-difference* in these marriages is greater than among the unmixed marriages. The *birth* statistics show, further, that many of the mixed marriages are forced marriages, and that in mixed marriages the number of children is smaller, whereas it has been evident in the preceding that each of these factors will increase the divorce-frequency; we shall have to look upon the high frequency among the mixed marriages also from this point of view.

COUPLES DIVORCED IN 1926–30 AS PERCENTAGES OF THE COUPLES MARRIED DURING THE PERIOD 1921–25 OF THE SAME RELIGION-COMBINATION

| Religion: | |
|---|---|
| Both Protestant | 7·3 |
| Both Roman Catholic | 6·1 |
| Both Jewish | 6·2 |
| Both "no religion" | 24·7 |
| Protestant with Roman Catholic | 8·2 |
| Protestant with Jewish | 12·6 |
| Protestant with "no religion" | 13·5 |
| Roman Catholic with Jewish | 11·7 |
| Roman Catholic with "no religion" | 17·7 |
| Jewish with "no religion" | 30·6 |

What the mutual relation between these factors is, and why they do especially come to the front in mixed marriages, are undoubtedly important questions also in connection with the divorce problem. The answer to these questions, however, would lead us beyond the dominion of the statistics.

## DIVORCE, SOCIAL CONDITION, AND PROFESSION

Is there among the different social classes of the population a deviating divorce-frequency? And are there also certain professions which give a greater relative frequency of divorce than others?

In order to examine these questions there are only a few data available, referring to the years 1929 and 1930. For these years the professions of the divorced males have been classified in a number of groups.

| | | |
|---|---|---|
| 1. | Directors of important branches of industry, manufacturers, etc. | 71 |
| 2. | Shopkeepers and other tradespeople of the middle classes | 74 |
| 3. | Hotel-, restaurant-, and café-keepers | 19 |
| 4. | Market-merchants, hawkers | 77 |
| 5. | Higher officials and intellectual professions | 86 |
| 6. | Artists | 39 |
| 7. | Lower functionaries, office personnel, designers | 126 |
| 8. | Commercial travellers | 73 |
| 9. | Captains, mates, and others | 23 |
| 10. | Other sailors, skippers | 25 |
| 11. | Hotel and restaurant personnel | 45 |
| 12. | Drivers and other transport personnel | 57 |
| 13. | Other skilled workmen | 403 |
| 14. | Unskilled workmen (dock workers, etc.) | 142 |
| 15. | No profession or profession unknown | 45 |
| | Total | 1,305 |

Comparison with the total population is not possible for this part of our research work, as there is no division of the male professional population of Amsterdam as to the married and the unmarried males. It is less exact to compare the figures in question with the professions of the males having contracted a marriage in a determined period, as in the period between marriage and divorce not only an alteration as to the nature of the profession may happen, but also as to the *position* in the profession.

Nevertheless, the preceding data give a few indications. The great number of directors of big concerns, etc., namely 71, as compared with the number of shopkeepers and other middle-class people (74 + 19), leads to the supposition that the divorce-frequency is greater among the first-mentioned group. The same holds good for the higher officials and suchlike, as compared with the lower functionaries (86 against 126); of the captains, mates, etc., as compared with other sailors and skippers (23 against 25). As for the remainder (just over 50 per cent of all these divorced males may be reckoned amongst workmen, groups 10, 12, 13, 14, 15), there is some reason to presume that among these groups of the population, and in general among the groups of less prosperity, the divorce-frequency is lower, which fact, however, as has been pointed out several times already, is not identical with better matrimonial relations. The opinions about divorce and divorced persons are not the same in the different classes of the population, and this may also cause the fact that in otherwise equal matrimonial conditions divorces occur more often in one group than in the other.

If we consider further the separate professions, we are struck by the relatively high rates for market-merchants and hawkers, artists and commercial travellers. Probably there is for these professions a greater frequency of divorce.

We must restrict ourselves to these remarks; the material available does not allow of approaching more positively the divorce problem as a social problem.

## "NUMBER OF BIRTHS"

### (Birth-Rates)

The simplest way to indicate the increase or the decrease of the number of births is to give the annual number of live births per 1,000 inhabitants (*birth-rate*). As, however, the age-distribution of the population changes in the course of time, the real development of the birth-phenomenon is more nearly approximated by stating the number of legitimate children annually born per 1,000 married women in the fertility age, which one generally presumes to be from 15 to 49 years, or the total number of children born per 1,000 of the aggregate women of that age (*the fertility-rate*).[1]

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[1] Landry (*Journal de la Société de Statistique de Paris*, 1931, p. 24) proposes to take the "table-population" in order to calculate this figure. Hersch, in the *Revue de l'Inst. Int. de Statistique*, 1934, p. 15, raises objections against this method.

Kuczynski is of the opinion that it is preferable to trace if every woman who takes part in procreation is replaced by another woman.[1] In order to do so, we shall have to investigate how many out of 1,000 women born will reach the fertility age and the number of girls to whom they will give birth.[2]

For Amsterdam we have the following data:

During the eighteenth century the number of live births remained practically between 6,500 and 7,000; in the nineteenth century it increased gradually; till 1850 it mounted to 8,000, after 1870 to 9,000, after 1900 to 15,000; in 1910 it was a little lower, namely, 13,500, and since that date it has remained at this level, excepting a few increases after the war (1920–24), in spite of the increase of the population. But during recent years one notices a slight decline. In the years 1828–31 the birth-rate was 34·0, in 1838–41, 36·4; after 1860 it increased gradually to the record of 37·6 in the year 1884, after which date the decline started. This decline still continues, a few fluctuations in and after the war (1915–20) excepted. In 1930 this rate had come down to 17·4, and nowadays it is only 15.

This decrease manifests itself also in the fertility-rate, which can only be computed for the years immediately preceding and following the census, as only the census indicates the number of married females from 15 to 49. From the years 1849–50 to the period 1875–84 the birth of legitimate children increased from 259 to 270 annually per 1,000 married women (15–49), and afterwards it has gradually declined to 105 in the years 1930–31.

This decrease of the marriage-fertility has created for Amsterdam a situation in which a certain number of females is not producing any longer the same number of females. With death-rates and birth-rates as we stated for the years 1930 and 1931, 924·52 out of 1,000 born girls reach the age of 17½ (average of the first age-group of five years, in which the fertility age of 15–49 is divided for this computation). This number decreases to 834·84, caused by deaths for the last of those age-groups (47½ years). If we apply the fertility rates of the years 1930 and 1931 to each of those age-groups, we find that those 924·52 women, if their fertility remains as it was in 1930 and 1931, produce till their fiftieth year 821·25 daughters, so that every woman is only, as to 0·8, replaced by another woman. During the years 1925 and 1926 this figure was still 0·9, namely, 932·65 on 1,000. In 298 years these figures would have led to the halving of the population, if we neglect the other influencing factors. Nowadays, according to the actual birth- and death-rates, the halving of the population would be attained in only 105 years.

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[1] *The Balance of Births and Deaths*, vol. i, *Western and Northern Europe*, New York, 1928, p. 42. He calls this "net reproduction-rate."

[2] During the last few years the investigations have gone still deeper. One has tried to consider the number of births in relation to the lapse of time during which the woman is capable of conceiving; in other words, to the aggregate fertility-time of the married females from 15 to 49 years, reduced by the duration of the consecutive pregnancies during the period of marriage and by a couple of months after each delivery, and further by the time elapsing after the decease of one of the partners or after a divorce till the fiftieth year of the woman. See C. Gini, "Sur la mesure de la fécondité des mariages," in *Bulletin de l'Inst. Int. de Statistique*, xxvii (1933), 2, pp. 40 ff., and "Su la curva della fecondità matrimoniale della donna seconda l'età," H. Eod, xxviii (1935), 2, pp. 71 ff., and A. C. Mukerji, "Etude statistique de la fécondité matrimoniale," Paris, 1935. For Amsterdam the data necessary to make such a computation are not yet available.

The important decrease of the birth-rates has, more than formerly, drawn attention to the *possible* births, the number of conceptions, which is much bigger than the number of children born alive. The number of conceptions decreases not only with the still-births, but also with the premature births, the cases of natural and provoked abortion.

As to the *still-births*, we have to face a difficulty of deciding when a child has to be removed from the birth statistics as being still-born. In the Netherlands, before the year 1925 a child was regarded as being born alive if during the notification it was still alive, so that one used the term "registered dead" instead of "born dead." Since January 1, 1925, every child which has lived is regarded as being born alive. As "having lived" is not stated everywhere in the same way, some authors[1] are of the opinion that the children which have died the first days after the birth should be counted with the still-born children.

For Amsterdam in 1926–30 the number of *born alive* was 18·25 per 1,000 of the population, the number of *registered* dead 18·08 per 1,000, a difference of almost 0·2 per 1,000. During this period the number of *still-born* children was 2·6 per cent of the total number of born children, the number of *registered* dead 3·6 per cent. In 1850 this last percentage was more than 6, in

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[1] L. de Bernardinis, "Alcune considerazioni sul calcolo della natimortalità," *Bull. de l'Inst. Int. de Statistique*, xxvii (1933), 2, pp. 111 ff.

1880 it had declined to 5·5, in 1900 to 4·7, in 1910 to 3·7, in 1919 to 3·4, and during the period 1921–25 it was 3·8 per cent.

As to the number of *cases of abortion*, for Amsterdam we do not dispose of many data. In 1930, 697 cases were treated in the municipal hospitals,[1] which means 5 per cent of the number of births. This rate, however, is much too low.

In Magdeburg[2] and Lübeck[3] a special investigation has been made for a period of several years, among doctors and midwives, as to the frequency of abortion. In Magdeburg this inquiry gave the following results:

In the period 1924–27 an annual average of 1,624 cases of abortion have been notified with a number of 4,663 children born alive and 230 still-births, so that the number of conceptions in that town would have been 6,517 annually, of which number only 72 per cent have been born alive.

In Lübeck, during the years 1926–32, 13,019 children have been born alive, 442 have been born dead, and 6,507 cases of abortion have been notified, so that 19,968 conceptions took place, of which only 65 per cent led to a living child. For Milano, Salvatori Alberti[4] fixes the number of cases of abortion as 25 to 30 per cent of the number of conceptions. If we presume that for Amsterdam this percentage would be the same, the number of possible births would come 40 per cent higher than the number of really born-alive children already mentioned before, namely, 5,400 births more.

In conformity with the chapter on "Marriage," we have tried to establish a correlation between the number of births and *economic conditions*.

For the period 1870–1910 a correlation has been made between the annual birth-rate and the *discount* of the Netherland Bank, first of all for the same periods, afterwards by lagging the birth-rates a year, in order to allow for the period of gestation. The correlation has been calculated by means of the deviations from the nine years' moving averages (in other words, the deviations from the trend).

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[1] Quoted from *Annual Report of the Municipal Hospitals* (medical part).

[2] *Stat. Jahrbuch der Stadt Magdeburg für das Jahr 1929*, pp. 107 ff.

[3] *Reichsgesundheitsblatt*, July 11, 1934, p. 602.

[4] "La mortalité antinatale," *Publ. dell' Universita catolica del Sacro Cuore*, vol. vi, Milano, 1934, pp. 114 ff.

The result of the first method was a correlation of 0·21; the result of the last method was practically nil. Put into correlation with the *contango*, the result was also nil, namely, the figure 0·09. For the period 1890–1910, however, it was 0·37, but, calculated on the basis of the number of conceptions, again 0·11.

For the years 1926–30, following the example of Livi,[1] another method has been applied. For every quarter of the year the average conception-rate (the birth-rate three-quarters of a year removed) has been compared with the average index number of *unemployment*, namely, their percentage deviation from the averages of the corresponding quarters. The result is a correlation of — 0·17. However, if we take into account the changes of the figures, in other words, the differences between the consecutive quarters every time with the analogous quarter of the preceding year, we come to a result of — 0·38. A suchlike difference between the two methods has also been found by Livi, for instance, for England during the period 1926–30, namely, — 0·38 and — 0·55 respectively.

In any case, we are entitled to conclude that the correlation between birth-rates and economic situation, computed in this way, appears to be very small.

A comparison of Amsterdam with foreign towns which, as to the number of inhabitants, may be compared with Amsterdam, shows us that in the years 1900–4 Amsterdam, with a birth-rate of 28·4, occupied the eleventh place, out of twenty-one towns. It occupied just the middle place (highest place Warsaw with 35·5, lowest Lyons with 18·6). But during the years 1926–30 it occupied the eighth place out of twenty-three towns, with 18·1 (highest Montevideo with 28·8, lowest Stockholm with 11·0). Consequently, in other towns, the birth-rates have decreased more strongly than in Amsterdam. Warsaw shows, amongst others, the intensity of this decline, having occupied the highest place with 35·5 in 1900–4, and having come down to 19·6 nowadays.

The English towns, too, demonstrate this decrease, having come down from 32 to 16 or 17.

We must consider the fact, already mentioned in the chapter on "Marriage" as being the most important cause of these higher birth-rates in Amsterdam, namely, that in Amsterdam people marry at a younger age than in foreign countries, and the young marriages are the most fertile ones.

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[1] "Influence des variations des conditions sanitaires et économiques de la population sur le mouvement oscillatoire de la natalité," *Bull. de l'Inst. Int. de Statistique*, xxvii, 1933 (2), pp. 128–141.

## BIRTH-RATES ACCORDING TO PROSPERITY LEVEL

Several investigations as to the relation between birth-rates and prosperity level have already been made.[1] Such an investigation has been made in Zürich,[2] from which it has appeared that the course of the birth-rates in five groups of town districts, ranged as to their prosperity level, has been in the last fifty years as follows:

| Prosperity-Group | 1876–80 | 1926–27 | Percentage of Decrease | |
|---|---|---|---|---|
| | | | Birth-Rate | Fertility-Rate |
| I | 41·5 | 15·1 | 64 | 61 |
| II | 25·1 | 10·3 | 60 | 45 |
| III | 32·8 | 14·8 | 55 | 48 |
| IV | 32·6 | 11·1 | 66 | 53 |
| V | 33·9 | 12·3 | 64 | 47 |

We see that in Zürich, neither formerly nor nowadays, the birth-rate is at its lowest at the highest prosperity level. The decrease has been equal in the highest and in the lowest prosperity level; the differences between the groups, however, have diminished.

In Bremen, too,[3] an analogous investigation has been made by the Statistical Department, with the following result:

| Districts | 1901 | 1925 | Difference |
|---|---|---|---|
| Labour districts .. | 43·7 | 19·5 | 55 per cent less |
| Middle-class districts .. | 28·9 | 14·2 | 51 per cent less |
| Well-off districts .. | 12·7 | 14·7 | 16 per cent more |

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[1] Bertillon has already recorded figures for the years 1889–83 in *Bulletin de l'Inst. Int. de Statistique*, xii, 2, pp. 163 ff.

[2] *Geburtenzurückgang in Zürich nach sozialen Schichten. Züricher Stat. Nachrichten Jg.*, 1928, pp. 26 ff.

[3] "100 Jahre Geburten Statistik," *Mitt. des Stat. Landes-amts*, 1926, p. 36.

Here, for the better-off people, the birth-rates have even increased.

For Amsterdam we are able to use the data referring to the birth-rates in different districts and town quarters for our comparison as to the different prosperity levels, this last factor being deduced from the data concerning the number of assessments for income tax available in those quarters.

As, however, the age-distribution, and thus the relative number of married females in the fertility age, diverges considerably in the different parts of the town, we have to consider the fertility-rates here. By doing so, we find the highest fertility-rates for the lowest prosperity level and vice versa, but we cannot speak of a complete regularity. In the first place, some quarters diverge totally from the average. Here other factors must influence the rates, probably the religion. Moreover, the computation of the fertility-rates (number of legitimate births on 1,000 married females from 15 to 49) appears to be insufficient to eliminate entirely the influence of a different age-distribution, as ultimately the fertility depends mainly on the number of women of 20–29, and this number, too, is different in the different town quarters. Hence this factor has also to be taken into account when we desire a proper comparison.

If we place the town districts in the order of prosperity level (according to the percentage assessments in income tax above 3,100 guilders during the income-tax year 1919–20), namely, from the lowest to the highest, we come to the following result:

FERTILITY-RATE

| District of the Town in order of Prosperity Level | Fertility-Rates | | Percentage Decrease |
|---|---|---|---|
| | 1919–22 | 1929–32 | |
| VI | 200·5 | 154·9 | 22·7 |
| VIII | 155·7 | 107·5 | 31·1 |
| III | 180·4 | 141·6 | 21·5 |
| XIII | 178·2 | 111·1 | 37·7 |
| II | 176·2 | 127·5 | 27·6 |
| XII | 125·6 | 105·6 | 15·9 |
| IX | 129·9 | 94·3 | 27·4 |
| XI | 132·7 | 88·2 | 33·5 |
| V | 148·8 | 107·9 | 27·5 |
| I | 166·1 | 85·0 | 48·8 |
| IV | 116·6 | 86·8 | 25·6 |
| X | 115·9 | 81·7 | 29·5 |

The decrease of the fertility during the last ten years does not run parallel with the prosperity. In order to get a better insight, it is necessary to involve the factor of religion.

Further on we will go more deeply into this matter, but we wish to state now that the fertility is highest in the quarters with many Roman Catholics and in those with a great many of the members of the Reformed Churches.

Another manipulation leads to the same conclusion, when we take, instead of the districts, combinations of town quarters some with the highest, some with a middling, and some with a low prosperity level, and compare their fertility–rate with the percentage of Roman Catholics and with that of the Reformed.

## Birth-Rates according to the Months of the Year

In the Communication No. 91 of the *Statistical Bureau of Amsterdam*, Wolda has made a special study of the periodicity of births, to which belongs also the explanation of the different month-peaks, more especially the peak of February–March. We may refer to this publication.

It appears from the tables that the decrease of the birth-rates has not changed the mutual relation of the months; it did not affect the bigger peak in February–March and the smaller ones in August–September and in December, nor the lowest point in July. This will appear from the following table:

NUMBER OF BIRTHS IN JANUARY, FEBRUARY, ETC., AS PERCENTAGE OF THE AVERAGE MONTHLY NUMBER OF THE BIRTHS IN ALL MONTHS IN EACH PERIOD

| Periods | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1811–15 | 104·6 | 115·8 | 112·9 | 109·3 | 102·7 | 101·8 | 87·5 | 86·4 | 91·4 | 93·7 | 95·8 | 98·2 |
| 1856–60 | 107·9 | 113·7 | 110·7 | 103·7 | 98·7 | 92·0 | 85·7 | 91·7 | 93·8 | 98·8 | 105·2 | 98·4 |
| 1896–1900 | 102·0 | 107·7 | 103·8 | 98·0 | 99·2 | 95·0 | 98·9 | 101·9 | 98·9 | 94·9 | 98·3 | 101·3 |
| 1926–30 | 101·6 | 106·9 | 100·3 | 100·0 | 101·3 | 100·7 | 101·6 | 99·6 | 98·5 | 96·2 | 94·8 | 98·5 |

We are entitled to presume that these maxima and minima have a natural, a biological cause. That, for instance, the February peak has no relation with a great number of marriages in May, as one formerly believed, appears from the fact that, in spite of the disappearance of the May peak for marriages in Amsterdam, as has been stated in the chapter "Marriages," the February peak for births has remained. Whereas, further, during the period 1921–25 an average of only 15 per cent, in the last years even 8½ per cent of the first-born have been born in the tenth month after the marriage, we are no longer able to find a relation between the month in which the marriage took place and the month in which the first-born appears. It is noteworthy that the February peak manifested itself formerly for the first-born as well as for the later-born children, but that it has removed itself for the first-born to May.

Wolda has demonstrated that the spring peak manifests itself especially for the young and for the older parents. The following figures, composed in the same way as the figures above, give the births per 100 of the monthly average of births for first-born (*a*) and later-born children (*b*) during the years since 1911.

| Period | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| 1911–15 (*a*) | 95·2 | 103·5 | 110·7 | 103·4 | 103·7 | 105·2 |
| 1911–15 (*b*) | 103·8 | 108·4 | 100·8 | 97·6 | 99·3 | 95·1 |

| Period | July | August | September | October | November | December |
|---|---|---|---|---|---|---|
| 1911–15 (*a*) | 103·7 | 100·3 | 96·7 | 93·0 | 94·5 | 90·1 |
| 1911–15 (*b*) | 97·8 | 98·6 | 98·3 | 98·2 | 99·5 | 102·6 |

| Period | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| 1921–25 (*a*) | 100·3 | 101·0 | 102·5 | 103·5 | 106·9 | 103·6 |
| 1921–25 (*b*) | 105·4 | 107·1 | 102·2 | 102·1 | 100·4 | 100·4 |

| Period | July | August | September | October | November | December |
|---|---|---|---|---|---|---|
| 1921–25 (*a*) | 104·1 | 100·7 | 101·2 | 88·9 | 91·5 | 95·4 |
| 1921–25 (*b*) | 98·8 | 99·0 | 97·1 | 93·2 | 96·0 | 98·3 |

| Period | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| 1926–30 (a) | 94·2 | 104·3 | 94·6 | 99·4 | 105·2 | 100·4 |
| 1926–30 (b) | 104·1 | 106·8 | 101·5 | 99·4 | 98·4 | 99·4 |

| Period | July | August | September | October | November | December |
|---|---|---|---|---|---|---|
| 1926–30 (a) | 102·9 | 100·7 | 101·2 | 90·7 | 91·6 | 93·2 |
| 1926–30 (b) | 100·1 | 97·8 | 96·3 | 98·2 | 97·2 | 100·2 |

And finally we want to prove once more that it concerns a natural phenomenon by showing the same figures for the monthly illegitimate births, where the spring peak shows itself more clearly than for the legitimate births. The strong influence of spring on the conceptions is undeniable.

| Periods | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| 1911–15 | 104·0 | 113·2 | 109·2 | 97·2 | 108·8 | 94·8 |
| 1921–25 | 120·4 | 88·0 | 92·9 | 107·6 | 108·9 | 101·3 |
| 1926–30 | 106·2 | 110·0 | 111·4 | 94·8 | 95·7 | 97·6 |

| Periods | July | August | September | October | November | December |
|---|---|---|---|---|---|---|
| 1911–15 | 94·4 | 96·0 | 97·2 | 89·2 | 100·0 | 96·0 |
| 1921–25 | 109·8 | 92·4 | 94·7 | 86·2 | 93·8 | 104·0 |
| 1926–30 | 93·8 | 100·9 | 94·3 | 90·5 | 108·1 | 98·6 |

## STILL-BIRTHS

We have already mentioned the fact that the percentage of children registered dead has decreased gradually. Whereas in 1850 still more than 6 per cent of the total births were registered dead, this percentage declined gradually to 5·5 in 1880, 4·7 in 1900, 3·7 in 1910, on which level it remained for some time. During the period 1926–30 the percentage of *still-births* decreased from 2·6 to 2·5.

The percentage of still-births is always higher for boys than for girls. Whereas before 1925 the difference for registered dead children was ½ to 1 per cent, afterwards, for the children born dead, it has never been more than 0·2 to 0·6 per cent. The boys, indeed, have still a somewhat smaller chance.

The difference between legitimate and illegitimate children in this regard is much bigger; however, this rate, too, has diminished considerably in the course of years. Whereas, for instance, in 1860 still 5·8 per cent of the legitimate and 11·9 per cent of the illegitimate children have been registered dead, which means a difference of 6·1 per cent, these percentages were, for 1920, 3·9 and 7·5, a difference of 3·6; in 1930, 2·4 per cent of the legitimate and 4·1 per cent of the illegitimate had already died at the moment of birth, a difference of 1·7.

## ILLEGITIMATE BIRTHS

We are used to determine the extent of the phenomenon of the illegitimate children by the percentage which they form of the total number of births. Applying this method, we presume, however, that the legitimate and illegitimate births are subject to the same laws of nature, which supposition is not at all sure. It is very possible that the decrease of the marriage fertility, which we have stated in the preceding, has not been accompanied by a proportional decrease of the number of illegitimate children; and in that case the percentage in question would not give a proper image of the situation.

If we want to study the two phenomena separately, it will be necessary to relate the illegitimate children to the unmarried women of 15–49 years, just as we related the legitimate births with the number of married women of that same age. If we do so, it appears indeed that the two methods of computation lead to different results, which can be shown in the following table:

| Period just before and just after Census of— | LEGITIMATE BIRTHS | ILLEGITIMATE BIRTHS | |
|---|---|---|---|
| | Annual Average per 1,000 Married Females of 15–49 | Per 1,000 Unmarried Females of 15–49 | Percentage of all Births |
| 1859 | 252 | 15·6 | 7·5 |
| 1869 | 250 | 15·3 | 6·7 |
| 1879 | 270 | 17·4 | 6·4 |
| 1889 | 254 | 17·6 | 6·8 |
| 1899 | 222 | 11·8 | 5·4 |
| 1909 | 178 | 7·5 | 4·4 |
| 1920 | 141 | 6·6 | 4·1 |
| 1930 | 105 | 4·9 | 3·8 |

It appears from these figures that, whereas the percentage which the number of illegitimate children forms of the total births has declined by 50 per cent, the number per 1,000 unmarried women is 68·6 per cent lower. Hence the situation is more favourable than we should deduce from the first figure. This is caused by the fact that the marriage fertility has not decreased to the same degree.

In Amsterdam the percentage of illegitimate children has always been rather small, as indeed it has always been low for our whole country. In this century it has not surpassed in one single year the number 5. In 1911 it was for the first time below 4, and since 1919 it has never surpassed 4. The highest rate known was the one for 1850, namely, 9·7.

In judging the decrease of this percentage, we have to take into account the increasing application of preventatives and the interruption of pregnancy.

In order to interpret better the decrease of this figure, it is necessary to study its importance in the *separate age-groups*. This appears from the following table:

ILLEGITIMATE BIRTHS: ANNUAL AVERAGE PER 1,000 UNMARRIED FEMALES IN EACH AGE-GROUP

| Age-Groups | 1908–11 | 1916–25 | 1927–34 |
|---|---|---|---|
| 15–19 | 4·20 | 3·52 | 2·11 |
| 20–24 | 11·54 | 9·76 | 6·49 |
| 25–29 | 10·47 | 9·90 | 7·84 |
| 30–34 | 8·40 | 8·34 | 8·49 |
| 35–39 | 8·74 | 6·78 | 5·90 |
| 40–44 | 4·48 | 3·36 | 2·83 |
| 45–49 | 0·28 | 0·39 | 0·42 |

There is an increase only in the groups 30–34 and 45–49. This fact allows us to admit a slight increase of concubinage as, for the older mothers, these figures will probably not refer to first-born. To this we will refer further on.

The fact that the number of illegitimate children is very low in the Netherlands appears from a comparison with the *foreign towns*, already mentioned several times before. In the Dutch and the English towns it is lower than in the towns in other countries. The greatest contrast is Birmingham with 3·5 and Münich with

32·2 per cent illegitimate children during the years 1926–30. Besides, in Bavaria and in Saxony, we find also high rates in the Scandinavian countries (Copenhagen with 23·4, Stockholm with 26·0 per cent). In the beginning of this century the relative positions were the same. We can conclude from this that here we have to deal with different customs and habits, and not with greater or less immorality.[1] This appears clearly from the reasons for the high rates which the statistical departments of some great towns gave us after our inquiry.

For instance, in *Stockholm* the so-called "Stockholm marriage" is in vogue, an institution whereby a man and a woman live together without being married, their mutual relation and their relation to the children being legally regulated, and this union is followed much later by a real marriage.

In *Saxony*, in a third part of the cases the marriage is contracted after the birth of the child; a third of the number of illegitimate children die before the age of 5 years; and one-third, namely, 7 to 8 per cent of the aggregate born children, remains out of wedlock.

In *Bavaria*, in rural areas it is the habit, also in regard to landed property and the inheritance of land, that people marry late. The children that, as a result of this habit, are born out of wedlock see the light in the town (Münich), and sometimes they depress the figure for this town, mentioned in the statistics. However, the percentage of illegitimate children among the actual population in Münich is also high (28 per cent in 1933). The following reasons are given here: greater aversion for prevention and interruption of pregnancy and a stronger habit of concubinage of engaged couples than elsewhere. The number of recognitions by marriage is in consequence very big.

And so everywhere the high ratios will correspond with the social circumstances.

Neither can we isolate these percentages from those of the first-born conceived before the marriage. In Amsterdam, 22 per cent of the first-born are born within the first six months after the marriage, and 8 to 10 per cent in the seventh, eighth, and ninth months, and also in half of the number of these last cases the conception has taken place before the marriage.

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[1] A. Bohac comes to an analogous conclusion in "L'influence de l'irréligiosité sur la natalité en Bohème (Tchechoslavaque)" in *Metron*, xi, 3, 1934, pp 65 ff.

In only very few countries these last-mentioned data are compiled in the statistics. In Saxony, where these records do exist, the results were for 1914, 51·8 per cent and 10 per cent respectively. Here, too, it is important to take the different age-groups into consideration in order to be able to judge of the differences. A few data for some foreign towns are available, which have been worked out in the following table, which shows the annual average of unmarried mothers in every age-group per 1,000 unmarried women at the cenus which took place during the periods.

| Towns | Periods | Mothers of— | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 15–19 Years | 20–24 Years | 25–29 Years | 30–34 Years | 35–39 Years | 40 Years and over | 15–49 Years |
| Amsterdam | 1927–34 | **2·1** | **6·5** | **7·8** | **8·5** | **5·9** | **2·8** | **4·9** |
| Zürich . . . | 1929–32 | 3 | 13 | 12 | 5 | 4 | 1 | 8 |
| Prague . . | 1926–29 | 6·2 | 12·3 | 11·3 | 7·6 | | 1·1 | 8·2 |
| Hamburg . . | 1923–27 | 8·0 | 21·3 | 14·7 | 9·8 | 6·2 | 1·3 | 11·7 |
| Copenhagen | 1926–30 | 18·8 | 32·2 | 24·4 | 16·9 | 10·1 | 3·7 | 19·6 |
| Magdeburg | 1927 | 15·8 | 32·3 | 25·1 | 11·6 | 9·1 | 3·8 | 20·0 |
| Stockholm | 1921–30 | 12 | 28 | 20 | 13 | 9 | 4 | 22·1 |

Apparently it is especially the younger women who, in the municipalities with a great number of illegitimate births, contribute to the high rates; for older women consequently, in cases of concubinage, the differences with Amsterdam are curiously not so important.

It is interesting to trace whether the percentage of illegitimate children is also influenced by the *religion*. The sequence for the four big religion-groups is as follows:

| Periods | Percentage of Illegitimate Children to Children Born of— | | | |
|---|---|---|---|---|
| | Mothers without Religion | Roman Catholic Mothers | Protestant Mothers | Jewish Mothers |
| 1900–04 | 4·6 | 4·6 | 4·2 | 1·1 |
| 1905–09 | 6·7 | 5·0 | 4·4 | 1·2 |
| 1911–15 | 4·1 | 4·7 | 4·5 | 1·6 |
| 1916–20 | 4·1 | 4·7 | 4·3 | 1·7 |
| 1921–25 | 5·0 | 4·0 | 3·6 | 1·7 |
| 1926–30 | 4·4 | 3·7 | 3·7 | 2·1 |

One is struck by the low figure for Jewish mothers, which, however, has constantly increased, considerably even during the last period.

As the image becomes here clearer, too, if we make the number of illegitimate children independent of the marriage fertility, we give again the annual average per 1,000 unmarried females at the census held in the middle of the period.

| Periods | Protestant | Roman Catholic | Jewish | No Religion | Total | Non-Jewish |
|---|---|---|---|---|---|---|
| 1905–14 | 6·0 | 6·9 | 1·4 | 3·1 | 5·4 | 6·0 |
| 1916–25 | 5·2 | 6·3 | 1·6 | 2·1 | 4·5 | 4·8 |
| 1929–32 | 4·4 | 4·5 | 1·7 | 2·3 | 3·6 | 3·8 |

It remains to be seen whether here, too, the figures are influenced by an unequal modification in age-distribution of the unmarried women, in connection with the fact, already mentioned, that especially the younger ages come here into account. However, the data necessary to determine this exactly are missing.

## RATIO OF THE TWO SEXES

It is a well-known fact that the ratio between the number of births of living boys and girls varies around 105 : 100. To demonstrate this phenomenon it is preferable to take the figures of a whole country instead of those of one single town, as the records of the latter may be too small for this manipulation. Nevertheless, when we study the figures for Amsterdam, we see that it is also the number 105 which dominates. In the table below we give the figures for Amsterdam and the whole country.

| Periods | Amsterdam | The Netherlands |
|---|---|---|
| 1860–69 | 106·4 | 105·6 |
| 1870–79 | 105·1 | 105·2 |
| 1880–89 | 105.2 | 105.4 |
| 1890–99 | 104.3 | 105·1 |
| 1900–09 | 105.7 | 105.3 |
| 1910–20 | 105·4 | 105·7 |
| 1921–30 | 106·0 | 105·9 |

For a long time investigators have tried to find an explanation for this phenomenon; not only for that of the average ratio

105 : 100, but also that of the fluctuations around this average.[1]

If one puts the question how it is possible that 5 per cent more boys are born, although one is entitled to suppose that an equal number of boys and girls are conceived, one wants first to investigate from as far back as the moment of the conception, but this does not diminish the difficulty of the explanation. It is a fact that the numbers are seen to deviate much more for the still-births than for the live-births, namely, in favour of the boys. Sometimes they even surpass the ratio 120 : 100. They were, for instance, for—

| Periods | Amsterdam | | The Whole Country | |
|---|---|---|---|---|
| | Live-Births | Still-Births | Live-Births | Still-Births |
| 1921–25 | 105·4 | 119·3 | 105·7 | 123·4 |
| 1926–30 | 106·6 | 120·3 | 106·0 | 120·5 |

In other countries the same phenomenon can be stated. If we go deeper into the matter, and if we study the ratio of the different ages of the embryo of premature births, we find for still-births (equivalent figures for live-births do not exist) for the years 1918 to 1930 that, in Amsterdam, for 100 female embryos of six months old 82 males were born, of seven months 94 males, of eight months 113 males, of nine months 129 males, of ten months 127 males. For the whole country these figures were, for the years 1924–30, 115·1, 107·9, 116·9, and 127·5.

However, it has been stated by other investigations that the surplus of male embryos is at its greatest in the third month after the conception, and afterwards gradually declines. TSCHUPROW, in his well-known essay in the *Bulletin de l'Institut International de Statistique*,[2] mentions an investigation by AUERBACH about Budapest for the year 1912, from which study this decrease appears clearly. MARCELLO BOLDRINI states in his book, which appeared in 1934,[3] a number of investigations in which also rather regular decreases are recorded, sometimes from 300 or 200 boys per 100 girls in the third month to 108 or 106 in the eighth month of pregnancy, after which period in the ninth month a rise is sometimes stated. The Amsterdam figures are probably too small to allow to state this fact. For 3,000 cases of birth before the seventh month of pregnancy in the Netherlands which the Central Department of Statistics put at the disposal of the Amsterdam Bureau, the following order of succession has been found: Third month 259, fourth month 140, fifth month 124 male embryos per 100 females.

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[1] K. E. Busing gives a summary of the different theories in *Die Theorien über das Geschlechtsverhältnis der Geborenen und die Geschlechtsbestimmung beim Menschen*, Stuttgart, 1928.

[2] Tome xx, 2, pp. 378 ff.

[3] "Sulla proporzione dei sessi nel concepimenti e nelle nascite," *Laboratorio di statistica dell' Universita catolica del sacro Cuore*, Serie prima, pp. 30 ff.

However this may be, if we admit that the ratio diminishes in favour of the boys parallel to the increase of age of the embryo, the consequence would be that not the same amount of boys and girls, but 20 to 30 per cent more boys than girls, are conceived, and, moreover, several authors come to this same conclusion. But these authors forget that we hardly know anything about the first two months after the conception, because it is not easy in this period to define the sex of the embryo, and it is very well possible that just in these months the number of female embryos which disappear as a consequence of abortion is much bigger than that of the males.

Professor MYSBERG demonstrates that this last supposition must be correct in an essay in the *Ned. Tydschrift voor Geneeskunde*,[1] where he declares: "One half of the spermatozoa formed by a man carry the sex-chromosome. If a spermatozoon with a sex-chromosome fertilizes a female cell, a female embryo originates; if the fertilization is caused by a spermatozoon without a sex-chromosome a male embryo originates." Thus one can expect that the same number of boys and girls are conceived. As the female embryos have two sex-chromosomes, they carry the unfavourable chances of the males as well as of the females, and this explains why in the beginning of the pregnancy so many of the latter fall off. That this is really the case appeared from a number of experiments on animals made by the author; these experiments, however, are not apt to be applied on human beings.

This explanation of the phenomenon[2] also accounts for the further questions which arise as to the differences of the ratios which appear in different cases, namely:

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[1] 1926, II, pp. 846 ff.

[2] It has also been confirmed by Boldrini, "La proportion des sexes dans les conceptions humaines," in *Revue de l'Inst. Int. de Statistique*, 1936, pp. 484 ff.

In the *first* place, the well-known increase of boy-births, which nearly always manifests itself after a war, even in the non-belligerent countries. This phenomenon could be stated for Amsterdam, as well as for the whole country. In the years 1919, 1920, and 1921 the rate for the Netherlands was 106·7, 106·3, and 105·8 respectively; for Amsterdam it was 105·7, 107·4, and 107·5. Formerly the opinion was that the increase of the number of boys was due to the wish of the population to replace the war losses; but nowadays nobody will adhere to this opinion any longer. One is rather inclined to assign it[1] to a lack of food during the war and to a consequent weakening of the population. Generally, one considers a surplus of boys as a proof of weakness of the parents. The opinion of MYSBERG that the exhaustion during and after a war of both the parents harms more the living-chances of the girls than of the boys gives, nevertheless, a more acceptable explanation why this weakness leads to a bigger surplus of boys.

In the *second* place, the difference between legitimate and illegitimate births in this respect. In Amsterdam it was not very big.

| Periods | Legitimate | Illegitimate | Periods | Legitimate | Illegitimate |
|---|---|---|---|---|---|
| 1902–04 | 107·5 | 107·5 | 1916–20 | 105·7 | 106·4 |
| 1905–09 | 104·5 | 104·1 | 1921–25 | 105·3 | 109·3 |
| 1911–15 | 105·0 | 108·2 | 1926–30 | 106·7 | 104·2 |

Sometimes in foreign towns a smaller surplus of boys is found in the case of illegitimate than in that of legitimate births.[2] This fact is accredited to a bigger number of miscarriages among unmarried pregnants; for, as the number of male miscarriages after the second month dominates, these male miscarriages make the remainder smaller.

Similarly, it has been stated[3] that decline of marriage fertility involves a decreasing surplus of boys, caused by the bigger number of miscarriages. This may also account for the differences of the surplus of boys between towns and rural areas.

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[1] Dr. G. H. Hartman comes to the conclusion that there has not yet been found a solution for this question. *Allgemeines Stat. Archiv*, 1921–22, pp. 17 ff. ("Die Sexualproportion der Geborenen und der Krieg").

[2] See Tschupsow, *loc. cit.*, p. 430.

[3] Jacquart did this for Belgium. See Marie Stössel, in *Deutsches Statistisches Zentralblatt.*, 1927, col. 168.

In the *third* place, the influence of the age of the parents. In 1923[1] Methorst published the results of an examination of 3,330,000 cases of births in the Netherlands as to the age of the parents and the sex of the child. He came to the following conclusion: No definite influence of the age on the surplus of boys could be stated. He found, indeed, after the thirty-fifth year a greater chance for a smaller surplus of boys, and this surplus of boys was at its greatest in the years 1906–13 in cases where both parents were from 20 to 24 years old (109 : 100). But he did not venture to state a distinct connection.

And, *finally*, the fact that the surplus of boys is greater for first or second children than for the aggregate born children. For the following children it decreases, and afterwards it rises again. This has certainly to be attributed to the better living-chances of the embryo in the strong age of the parents.

Finally we still have to mention that Maurice Halbwachs made an analogous investigation as Methorst for French birth-rates, namely, as to the age-difference of the parents.[2] He is able to show a cyclical relation between the age-difference of the parents and the surplus of boys, and that, parallel to a decline of the age-difference up to a certain limit, the surplus first increases and then decreases. In this way he explains the fact that illegitimate children show a smaller surplus than legitimate, and children born in a town show a smaller surplus than children born in a rural district, from an unlike age-difference between the procreator and the mother, respectively the parents. To us, the above-mentioned explanation of Mysberg seems to be more acceptable.

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[1] See *De Economist*, 1923, p. 487 ff.

[2] *Journal de la Société de Statistique de Paris*, 1932, pp. 164 ff.

[*To be continued*

# TAUX DE REPRODUCTION ET AUTRES INDICES DÉMOGRAPHIQUES DES DÉPARTEMENTS FRANÇAIS, 1910–1912 ET 1930–1932

*par* PIERRE DEPOID, *Paris*

## MÉTHODES DE CALCUL

Le calcul des taux de reproduction est basé sur l'emploi des taux de fécondité et de mortalité par groupes de cinq ans publiés dans la *Statistique annuelle du mouvement de la population* et qui ont servi au calcul des taux comparatifs par département.

1.—Les taux de fécondité sont relatifs à l'ensemble formé par les naissances des deux sexes: on en a déduit les taux concernant les naissances féminines seules en multipliant chacun des taux par la proportion des naissances féminines dans le total des naissances vivantes de chaque département au cours de la période étudiée.

Le taux brut de reproduction a ainsi pour expression:

$$R = 5\frac{N_f}{N_m + N_f}(f_{15\cdot 19} + f_{20\cdot 24} + f_{25\cdot 29} + f_{30\cdot 34} + f_{35\cdot 39} + f_{40\cdot 44} + f_{45\cdot 49})$$

2.—Pour passer des taux bruts aux taux nets, il faut disposer pour chaque département d'une table de mortalité de la population féminine établie jusqu' à 50 ans: de telles tables sommaires ont été dressées à l'aide des taux moyens de mortalité désignés ci-dessus, en employant la méthode simplifiée que nous avons exposée dans une communication présentée au récent Congrès international de la population.[1] Toutefois, dans le cas présent d'une étude régionale de la mortalité, se rencontre une difficulté supplémentaire: c'est la détermination du taux de mortalité entre 0 et 1 an. Le simple rapport du nombre A des décès d'enfants de moins d'un an dans un département au nombre des nés vivants au cours de la même année, acceptable pour un pays entier, ne peut être admis pour un district administratif aussi réduit qu'un département à cause des déplacements d'enfants mis en nourrice hors du département de naissance. Pour améliorer la détermination du taux de mortalité, la Statistique générale de la France effectue depuis 1919 le classement des bulletins de décès de 0 à 1 an d'après le département de naissance: soit B le nombre des décès d'enfants nés dans un département donné. Pour la période 1930–32, on a tenu compte de ces résultats en répartissant les différences B — A entre les deux sexes proportionnellement aux nombres bruts de décès de chaque sexe enregistrés:

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[1] *La précision dans le calcul des taux de reproduction. Méthode de détermination approchée de ces taux et des indices de la population stable,* paraîtra prochainement dans les Actes du Congrès, vol. I.

$$B_f = A_f + (B - A)\frac{A_f}{A}$$

Pour la période 1910–12, en l'absence des données analogues, on a admis que dans chaque département les termes correctifs B — A étaient proportionnels à ceux établis pour 1930–32, ce qui est un peu arbitraire, car la statistique des enfants protégés montre une légère réduction des placements en nourrice.

D'une manière générale, le taux net de reproduction est donné par l'égalité:

$$r = 5\frac{N_f}{N_m + N_f}\,\frac{(f_{15\cdot19}s_{18} + f_{20\cdot24}s_{22} + f_{25\cdot29}s_{27} + f_{30\cdot34}s_{32} + f_{35\cdot39}s_{37} + f_{40\cdot44}s_{42} + f_{45\cdot49}s_{47})}{1{,}000}$$

$s_x$ désignant le nombre de femmes survivantes à l'âge $x$ sur 1,000 prises à la naissance.

3.—Pour calculer le taux d'accroissement de la population limite stable $\rho$, on utilise la formule approchée $1 \pm \rho = \sqrt[T]{r}$, T désignant l'âge moyen des mères à la naissance de leurs enfants pour une distribution par âge des mères conforme à la table de survie; il exprime également l'intervalle moyen qui sépare deux générations successives. Son calcul s'effectue de la manière suivante:

$$T = \frac{18f_{15\cdot19}s_{18} + 22\cdot5f_{20\cdot24}s_{22} + 27\cdot5f_{25\cdot29}s_{27} + 32\cdot5f_{30\cdot34}s_{32} + 37\cdot5f_{35\cdot39}s_{37} + 42\cdot5f_{40\cdot44}s_{42} + 47\cdot5f_{45\cdot49}s_{47}}{f_{15\cdot19}s_{18} + f_{20\cdot24}s_{22} + f_{25\cdot29}s_{27} + f_{30\cdot34}s_{32} + f_{35\cdot39}s_{37} + f_{40\cdot44}s_{42} + f_{45\cdot49}s_{47}}$$

La détermination de $\rho$ est obtenue à l'aide d'une table à double entrée établie par nous donnant $\rho$ en fonction de T et de $r$.

4.—Si toutes les naissances se produisaient à l'âge T, on aurait $r = R\frac{s_T}{1{,}000} = R\left(1 - \frac{d_T}{1{,}000}\right)$. Comme il n'en est pas rigoureusement ainsi en réalité, cette égalité ne se vérifie qu' approximativement; mais, comme l'âge moyen des mères à la naissance de leurs enfants varie dans des limites assez étroites autour de 30 ans, elle montre que le facteur mortalité influant sur le calcul de $r$ peut être caractérisé d'une manière satisfaisante par $d_{0\cdot29}$, somme des décès survenant entre 0 et 29 ans sur un effectif de 1,000 femmes prises à la naissance.

En 1910–12, le calcul des taux de reproduction n'est pas possible pour les départements d'Alsace-Lorraine, faute de la répartition des naissances vivantes d'après l'âge de la mère: on a évalué la valeur des taux bruts par comparaison avec les coefficients de fécondité générale et on en a déduit les taux nets par la formule approchée précédente.

Signalons enfin que, pour la Corse, certains indices conduisent à penser que l'effectif de la population présente est supérieur à la réalité et que les écarts, assez minimes chez les enfants, deviennent importants parmi les adultes: il en résulte que les taux par âge de natalité et de mortalité seraient trop faibles et qu'il en serait de même des taux de reproduction.

## EXAMEN DES RÉSULTATS

1. *Taux bruts de reproduction.*—Ils fournissent un classement des départements tout à fait analogue à ceux fournis par les coefficients de fécondité générale ou par les taux comparatifs.

### DÉPARTEMENTS OÙ LES TAUX BRUTS DE REPRODUCTION SONT

LES PLUS ÉLEVÉS

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Moselle | 197 | Pas-de-Calais | 152 |
| Finistère | 185 | Morbihan | 149 |
| Pas-de-Calais | 179 | Manche | 148 |
| Morbihan | 179 | Aisne | 145 |
| Côtes-du-Nord | 174 | Meuse | 145 |
| Lozère | 171 | Mayenne | 141 |
| Hautes-Alpes | 160 | Côtes-du-Nord | 141 |
| Bas-Rhin | 158 | Cantal | 141 |
| Meurthe-et-Moselle | 156 | Haute-Marne | 141 |
| Corse | 154 | Calvados | 140 |

LES PLUS FAIBLES

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Rhône | 84 | Alpes-Maritimes | 74 |
| Seine | 86 | Seine | 77 |
| Gironde | 88 | Bouches-du-Rhône | 84 |
| Gers | 93 | Pyrénées-Orientales | 87 |
| Lot-et-Garonne | 95 | Seine-et-Oise | 88 |
| Haute-Garonne | 96 | Corse | 90 |
| Allier | 99 | Rhône | 91 |
| Alpes-Maritimes | 99 | Hérault | 92 |
| Tarn-et-Garonne | 104 | Var | 92 |
| Var | 105 | Gard | 95 |

## INDICES DÉMOGRAPHIQUES, 1910–12

| Départements | Taux de reproduction (p. 100 femmes) |  | Décès de 0 à 29 ans sur 1,000 filles nées vivantes | Intervalle moyen de deux générations (en années) | Taux naturel d'accroissement (p. 10,000 habitants) |
|---|---|---|---|---|---|
|  | brut (1) | net (2) | (3) | (4) | (5) |
| Ain | 125 | 100 | 210 | 28·5 | 0 |
| Aisne | 136 | 105 | 238 | 27·9 | 18 |
| Allier | 99 | 83 | 176 | 27·2 | — 68 |
| Alpes (Basses-) | 131 | 93 | 297 | 29·5 | — 26 |
| Alpes (Hautes-) | 160 | 106 | 337 | 30·1 | 20 |
| Alpes-Maritimes | 99 | 72 | 283 | 28·7 | — 114 |
| Ardèche | 144 | 100 | 305 | 30·5 | 1 |
| Ardennes | 136 | 107 | 227 | 28·0 | 22 |
| Ariège | 115 | 89 | 236 | 28·4 | — 42 |
| Aube | 115 | 88 | 240 | 27·8 | — 44 |
| Aude | 106 | 83 | 230 | 27·9 | — 68 |
| Aveyron | 145 | 106 | 269 | 29·9 | 20 |
| Belfort | 134 | 104 | 233 | 28·9 | 14 |
| Bouches-du-Rhône | 112 | 79 | 307 | 28·2 | — 83 |
| Calvados | 135 | 100 | 267 | 28·3 | 0 |
| Cantal | 140 | 107 | 233 | 29·6 | 23 |
| Charente | 115 | 95 | 185 | 27·9 | — 18 |
| Charente-Inférieure | 114 | 93 | 195 | 27·7 | — 27 |
| Cher | 110 | 92 | 175 | 27·8 | — 28 |
| Corrèze | 135 | 104 | 237 | 28·8 | 15 |
| Corse | 154 | 108 | 293 | 31·1 | 25 |
| Côte-d'Or | 108 | 86 | 207 | 28·4 | — 51 |
| Côtes-du-Nord | 174 | 126 | 267 | 30·6 | 77 |
| Creuse | 109 | 92 | 170 | 27·9 | — 29 |
| Dordogne | 125 | 100 | 211 | 28·1 | — 1 |
| Doubs | 147 | 111 | 250 | 29·9 | 34 |
| Drôme | 113 | 85 | 253 | 29·2 | — 57 |
| Eure | 134 | 103 | 240 | 27·7 | 12 |
| Eure-et-Loir | 139 | 109 | 227 | 28·0 | 30 |
| Finistère | 185 | 132 | 289 | 30·2 | 91 |
| Gard | 111 | 79 | 293 | 28·8 | — 81 |
| Garonne (Haute-) | 96 | 75 | 235 | 27·4 | — 105 |
| Gers | 93 | 78 | 172 | 27·7 | — 90 |
| Gironde | 88 | 72 | 197 | 27·1 | — 122 |
| Hérault | 108 | 79 | 278 | 28·1 | — 83 |
| Ille-et-Vilaine | 137 | 101 | 259 | 30·3 | 2 |
| Indre | 117 | 99 | 166 | 28·0 | — 4 |
| Indre-et-Loire | 110 | 90 | 193 | 27·6 | — 38 |
| Isère | 106 | 82 | 232 | 29·2 | — 67 |
| Jura | 132 | 102 | 230 | 29·3 | 8 |
| Landes | 123 | 105 | 153 | 28·1 | 17 |
| Loir-et-Cher | 124 | 101 | 196 | 27·8 | 3 |
| Loire | 111 | 85 | 242 | 29·1 | — 58 |
| Loire (Haute-) | 129 | 97 | 247 | 30·5 | — 9 |
| Loire-Inférieure | 116 | 92 | 211 | 29·6 | — 29 |
| Loiret | 121 | 97 | 208 | 28·2 | — 12 |
| Lot | 110 | 81 | 267 | 28·5 | — 73 |

## INDICES DÉMOGRAPHIQUES, 1910–12—*suite*

| Départements | Taux de reproduction (p. 100 femmes) | | Décès de 0 à 29 ans sur 1,000 filles nées vivantes | Intervalle moyen de deux générations (en années) | Taux naturel d'accroissement (p. 10,000 habitants) |
|---|---|---|---|---|---|
| | brut (1) | net (2) | (3) | (4) | (5) |
| Lot-et-Garonne | 95 | 77 | 195 | 27·0 | — 95 |
| Lozère | 171 | 122 | 285 | 31·0 | 63 |
| Maine-et-Loire | 111 | 90 | 199 | 28·8 | — 38 |
| Manche | 146 | 110 | 253 | 29·1 | 32 |
| Marne | 132 | 98 | 272 | 27·9 | — 7 |
| Marne (Haute)- | 127 | 101 | 215 | 28·4 | 5 |
| Mayenne | 148 | 114 | 238 | 29·0 | 45 |
| Meurthe-et-Moselle | 156 | 114 | 277 | 28·4 | 47 |
| Meuse | 146 | 110 | 251 | 28·6 | 35 |
| Morbihan | 179 | 135 | 239 | 30·7 | 98 |
| Moselle | 197 (*a*) | 140 (*a*) | 284 | — | 115 (*a*) |
| Nièvre | 112 | 90 | 215 | 27·7 | — 39 |
| Nord | 132 | 97 | 271 | 28·9 | — 12 |
| Oise | 132 | 101 | 249 | 27·7 | 3 |
| Orne | 125 | 96 | 242 | 28·2 | — 15 |
| Pas-de-Calais | 179 | 130 | 280 | 28·9 | 90 |
| Puy-de-Dôme | 105 | 84 | 207 | 28·3 | — 62 |
| Pyrénées (Basses-) | 145 | 114 | 214 | 30·3 | 42 |
| Pyrénées (Hautes-) | 114 | 88 | 233 | 29·4 | — 44 |
| Pyrénées-Orientales | 127 | 93 | 276 | 29·1 | — 25 |
| Rhin (Bas-) | 158 (*a*) | 118 (*a*) | 252 | — | 55 (*a*) |
| Rhin (Haut-) | 136 (*a*) | 102 (*a*) | 255 | — | 7 (*a*) |
| Rhône | 84 | 64 | 248 | 28·2 | — 157 |
| Saône (Haute-) | 131 | 102 | 223 | 29·1 | 8 |
| Saône-et-Loire | 124 | 99 | 208 | 28·2 | — 3 |
| Sarthe | 133 | 101 | 247 | 27·8 | 5 |
| Savoie | 145 | 108 | 255 | 30·0 | 25 |
| Savoie (Haute-) | 149 | 112 | 252 | 30·5 | 36 |
| Seine | 86 | 62 | 291 | 27·1 | — 176 |
| Seine-Inférieure | 153 | 104 | 318 | 28·8 | 14 |
| Seine-et-Marne | 120 | 95 | 221 | 27·8 | — 18 |
| Seine-et-Oise | 110 | 82 | 261 | 27·8 | — 69 |
| Sèvres (Deux-) | 127 | 105 | 183 | 28·6 | 15 |
| Somme | 124 | 93 | 267 | 27·7 | — 28 |
| Tarn | 111 | 87 | 219 | 28·0 | — 48 |
| Tarn-et-Garonne | 104 | 83 | 218 | 27·2 | — 70 |
| Var | 105 | 78 | 278 | 28·1 | — 91 |
| Vaucluse | 115 | 84 | 274 | 28·4 | — 60 |
| Vendée | 140 | 114 | 185 | 29·3 | 46 |
| Vienne | 123 | 103 | 172 | 28·2 | 10 |
| Vienne (Haute-) | 124 | 99 | 209 | 27·8 | — 2 |
| Vosges | 143 | 106 | 259 | 29·2 | 21 |
| Yonne | 106 | 85 | 211 | 27·7 | — 60 |
| FRANCE ENTIÈRE (*b*) | 124 | 94 | 250 | 28·6 | — 23 |

(*a*) Evaluation. (*b*) Evaluation pour les 90 départements.

## INDICES DÉMOGRAPHIQUES, 1930–32

| Départements | Taux de reproduction (p. 100 femmes) | | Décès de 0 à 29 ans sur 1,000 filles nées vivantes (3) | Intervalle moyen de deux générations (en années) (4) | Taux naturel d'accroissement (p. 10,000 habitants) (5) |
|---|---|---|---|---|---|
| | brut (1) | net (2) | | | |
| Ain | 112 | 96 | 151 | 28·4 | — 14 |
| Aisne | 145 | 123 | 161 | 27·9 | 74 |
| Allier | 99 | 87 | 136 | 26·9 | — 51 |
| Alpes (Basses-) | 113 | 95 | 167 | 29·1 | — 19 |
| Alpes (Hautes-) | 130 | 108 | 175 | 29·8 | 24 |
| Alpes-Maritimes | 74 | 63 | 160 | 28·0 | — 166 |
| Ardèche | 117 | 97 | 170 | 29·8 | — 10 |
| Ardennes | 138 | 119 | 150 | 27·7 | 61 |
| Ariège | 99 | 85 | 148 | 28·2 | — 57 |
| Aube | 118 | 100 | 158 | 27·6 | 1 |
| Aude | 109 | 92 | 151 | 27·8 | — 29 |
| Aveyron | 124 | 104 | 166 | 29·4 | 13 |
| Belfort | 124 | 107 | 144 | 28·3 | 24 |
| Bouches-du-Rhône | 84 | 70 | 175 | 28·0 | — 127 |
| Calvados | 140 | 116 | 182 | 28·2 | 51 |
| Cantal | 141 | 122 | 172 | 28·9 | 69 |
| Charente | 118 | 103 | 139 | 27·3 | 11 |
| Charente-Inférieure | 124 | 108 | 145 | 27·0 | 27 |
| Cher | 106 | 93 | 135 | 27·1 | — 26 |
| Corrèze | 111 | 96 | 140 | 28·0 | — 13 |
| Corse | 90 | 75 | 171 | 30·8 | — 93 |
| Côte-d'Or | 120 | 107 | 148 | 28·1 | 24 |
| Côtes-du-Nord | 141 | 114 | 196 | 29·6 | 44 |
| Creuse | 102 | 90 | 125 | 27·3 | — 37 |
| Dordogne | 119 | 104 | 135 | 27·6 | 13 |
| Doubs | 131 | 110 | 166 | 29·2 | 33 |
| Drôme | 101 | 86 | 159 | 28·7 | — 55 |
| Eure | 138 | 117 | 161 | 28·0 | 57 |
| Eure-et-Loir | 138 | 117 | 168 | 27·7 | 56 |
| Finistère | 131 | 107 | 190 | 29·3 | 22 |
| Gard | 95 | 80 | 165 | 28·2 | — 77 |
| Garonne (Haute-) | 98 | 84 | 153 | 27·3 | — 65 |
| Gers | 108 | 95 | 122 | 27·8 | — 17 |
| Gironde | 96 | 83 | 147 | 26·9 | — 69 |
| Hérault | 92 | 79 | 152 | 28·0 | — 85 |
| Ille-et-Vilaine | 132 | 108 | 181 | 29·4 | 26 |
| Indre | 114 | 100 | 135 | 27·3 | 1 |
| Indre-et-Loire | 118 | 102 | 156 | 27·3 | 6 |
| Isère | 102 | 85 | 166 | 28·6 | — 55 |
| Jura | 124 | 105 | 154 | 28·9 | 18 |
| Landes | 105 | 93 | 117 | 28·0 | — 24 |
| Loir-et-Cher | 123 | 109 | 126 | 27·3 | 32 |
| Loire | 101 | 86 | 161 | 28·6 | — 54 |
| Loire (Haute-) | 115 | 94 | 181 | 29·8 | — 20 |
| Loire-Inférieure | 116 | 98 | 169 | 28·4 | — 7 |
| Loiret | 118 | 102 | 153 | 27·5 | 6 |
| Lot | 109 | 94 | 141 | 28·4 | — 22 |

## INDICES DÉMOGRAPHIQUES, 1930–32—*suite*

| DÉPARTEMENTS | Taux de reproduction (p. 100 femmes) brut (1) | Taux de reproduction (p. 100 femmes) net (2) | Décès de 0 à 29 ans sur 1,000 filles nées vivantes (3) | Intervalle moyen de deux générations (en années) (4) | Taux naturel d'accroissement (p. 10,000 habitants) (5) |
|---|---|---|---|---|---|
| Lot-et-Garonne | 109 | 96 | 128 | 27·3 | — 13 |
| Lozère | 130 | 110 | 152 | 30·6 | 32 |
| Maine-et-Loire | 126 | 109 | 147 | 28·3 | 29 |
| Manche | 148 | 124 | 168 | 28·9 | 74 |
| Marne | 128 | 108 | 162 | 27·8 | 28 |
| Marne (Haute-) | 141 | 121 | 156 | 28·1 | 67 |
| Mayenne | 141 | 120 | 150 | 28·8 | 64 |
| Meurthe-et-Moselle | 138 | 114 | 180 | 28·2 | 45 |
| Meuse | 145 | 122 | 164 | 28·3 | 72 |
| Morbihan | 149 | 121 | 193 | 29·6 | 65 |
| Moselle | 136 | 114 | 166 | 29·0 | 46 |
| Nièvre | 115 | 99 | 147 | 27·4 | — 2 |
| Nord | 117 | 99 | 167 | 28·1 | — 4 |
| Oise | 135 | 115 | 166 | 27·6 | 49 |
| Orne | 134 | 114 | 155 | 28·2 | 47 |
| Pas-de-Calais | 152 | 124 | 192 | 28·5 | 75 |
| Puy-de-Dôme | 98 | 85 | 149 | 27·8 | — 60 |
| Pyrénées (Basses-) | 116 | 98 | 160 | 29·6 | — 7 |
| Pyrénées (Hautes-) | 113 | 96 | 157 | 28·7 | — 15 |
| Pyrénées-Orientales | 87 | 75 | 145 | 28·0 | — 98 |
| Rhin (Bas-) | 115 | 98 | 154 | 28·8 | — 7 |
| Rhin (Haut-) | 111 | 96 | 130 | 29·1 | — 13 |
| Rhône | 91 | 76 | 177 | 27·4 | — 99 |
| Saône (Haute-) | 125 | 107 | 147 | 28·6 | 24 |
| Saône-et-Loire | 116 | 100 | 146 | 27·9 | 0 |
| Sarthe | 137 | 116 | 162 | 27·4 | 54 |
| Savoie | 128 | 105 | 187 | 29·2 | 15 |
| Savoie (Haute-) | 118 | 98 | 177 | 29·7 | — 8 |
| Seine | 77 | 63 | 191 | 26·8 | — 171 |
| Seine-Inférieure | 129 | 104 | 201 | 28·1 | 16 |
| Seine-et-Marne | 122 | 104 | 161 | 27·7 | 15 |
| Seine-et-Oise | 88 | 74 | 174 | 27·4 | — 109 |
| Sèvres (Deux-) | 131 | 117 | 120 | 27·7 | 55 |
| Somme | 130 | 109 | 172 | 27·5 | 33 |
| Tarn | 106 | 91 | 152 | 28·0 | — 32 |
| Tarn-et-Garonne | 114 | 98 | 154 | 27·2 | — 9 |
| Var | 92 | 78 | 163 | 28·0 | — 89 |
| Vaucluse | 103 | 87 | 168 | 28·0 | — 50 |
| Vendée | 139 | 121 | 142 | 28·2 | 68 |
| Vienne | 124 | 109 | 129 | 27·6 | 31 |
| Vienne (Haute-) | 100 | 87 | 147 | 27·0 | — 51 |
| Vosges | 124 | 105 | 160 | 28·5 | 16 |
| Yonne | 122 | 106 | 144 | 27·8 | 19 |
| FRANCE ENTIÈRE | 110 | 93 | 166 | 28·0 | — 27 |

En 1910–12, le taux était inférieur à l'unité dans huit départements (urbains ou situés dans la vallée de la Garonne); en 1930–32, quinze départements (urbains ou situés sur le littoral méditerranéen) sont dans cette situation.

Pour la France entière, le taux s'est réduit de 124 à 110, soit une baisse de 11 p. 100. L'examen par département montre toutefois un accroissement de la fécondité dans 29 départements (représentés en noir sur le cartogramme III): ce sont, en dehors du Rhône et de la Gironde, des départements ruraux (Sud-Ouest, Centre-Ouest, Normandie, Nord-Est et Bourgogne).

Presque tous les départements les moins féconds en 1910–12 (sauf la Seine) enregistrent une amélioration. Par contre, la diminution dépasse 15 p. 100 dans 21 départements situés en majeure partie dans les régions où la fécondité était très élevée en 1910–12, d'où une réduction de la marge entre les extrêmes.

| | Taux moyen des trois départements | | Ecart relatif $\frac{(b) - (a)}{(a)}$ |
|---|---|---|---|
| | Les plus féconds (a) | Les moins féconds (b) | |
| En 1910–12 .. .. | 187 | 86 | 54 % |
| En 1930–32 .. .. | 150 | 78 | 48 % |

2. *Mortalité.*—Seule la mortalité des femmes de 0 à 49 ans influe sur les taux nets de reproduction: on a vu qu'on pouvait la caractériser par le nombre des décès entre 0 et 30 ans sur 1,000 femmes prises à leur naissance. Voici les départements où l'indice de mortalité considéré présente les valeurs extrêmes:

### DÉPARTEMENTS OÙ LA MORTALITÉ FÉMININE DE 0 À29 ANS EST

#### LA PLUS ÉLEVÉE

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Hautes-Alpes | 337 | Seine-Inférieure | 201 |
| Seine-Inférieure | 318 | Côtes-du-Nord | 196 |
| Bouches-du-Rhône | 307 | Morbihan | 193 |
| Ardèche | 305 | Pas-de-Calais | 192 |
| Basses-Alpes | 297 | Seine | 191 |
| Corse | 293 | Finistère | 190 |
| Gard | 293 | Savoie | 187 |
| Seine | 291 | Calvados | 182 |
| Finistère | 289 | Ille-et-Vilaine | 181 |
| Lozère | 285 | Haute-Loire | 181 |

LA PLUS FAIBLE

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Landes | 153 | Landes | 117 |
| Indre | 166 | Deux-Sèvres | 120 |
| Creuse | 170 | Gers | 122 |
| Gers | 172 | Creuse | 125 |
| Vienne | 172 | Loir-et-Cher | 126 |
| Cher | 175 | Lot-et-Garonne | 128 |
| Allier | 176 | Vienne | 129 |
| Deux-Sèvres | 183 | Haut-Rhin | 130 |
| Charente | 185 | Cher | 135 |
| Vendée | 185 | Indre | 135 |
| | | Dordogne | 135 |

Ce classement diffère profondément de celui fourni par les taux comparatifs[1] qui l'appliquent aux deux sexes et à tous les âges.

De 1910–12 à 1930–32, le nombre des décès a baissé dans l'ensemble du pays de 250 p. 1,000 (soit 1 sur 4 filles nées vivantes) à 166 (soit 1 sur 6) c'est à dire de 33 p. 100. Mais, *au point de vue du taux net de reproduction, ce qui intervient c'est le nombre des survivants* $s = 1{,}000 - d$: celui-ci est passé de 750 à 834, soit une *amélioration de* 11 *p.* 100.

La baisse de la mortalité a été générale: elle varie de 18 à 48 p. 100 suivant les départements. Elle est la plus élevée là où la mortalité était la plus forte, la plus faible là où la mortalité était la plus basse, si bien qu'ici encore la marge entre les extrêmes s'est réduit.

| | Indice moyen des trois départements où la mortalité est | | Ecart relatif $\frac{(b)-(a)}{(a)}$ |
|---|---|---|---|
| | La plus élevée (*a*) | La plus faible (*b*) | |
| En 1910–12 | 321 | 163 | 49% |
| En 1930–32 | 197 | 120 | 39% |

Il convient de remarquer que le nombre des décès en 1910–12 est particulièrement élevé du fait de la mortalité infantile exceptionnelle de 1911: au cours de cette année, la mortalité de 0 à 1 an a surpassé de 42 p. 100 celle des années voisines; de 1 à 4 ans l'écart a été de 21 p. 100. Donc, si l'année 1911 avait été "normale," la mortalité moyenne de 1910–12 aurait été inférieure à celle réellement enregistrée de 14 p. 100 entre 0 et 1 an, de 7 p. 100 entre 1 et 4 ans. Dans ces conditions, le nombre des décès entre 0 et 30 ans n'aurait été que de 235 au lieu de 250. Cette remarque s'applique à tous les départements, mais dans des proportions variables.

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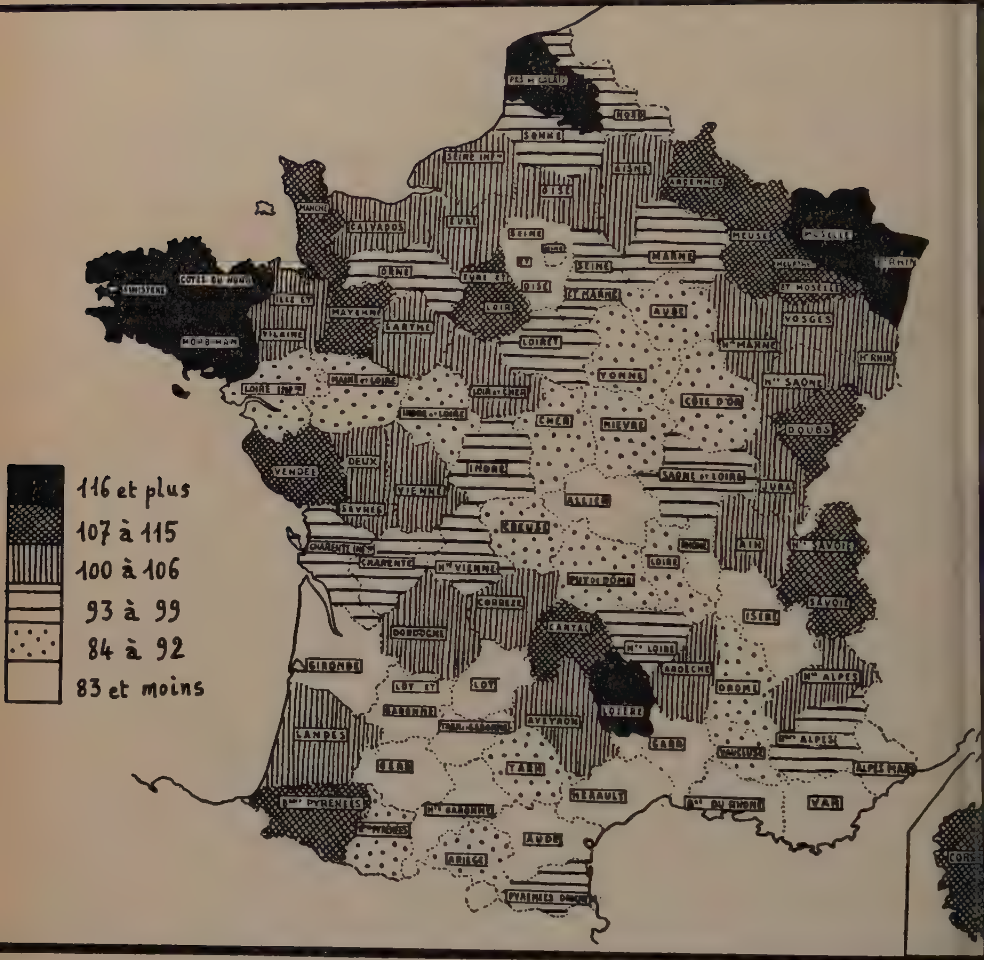
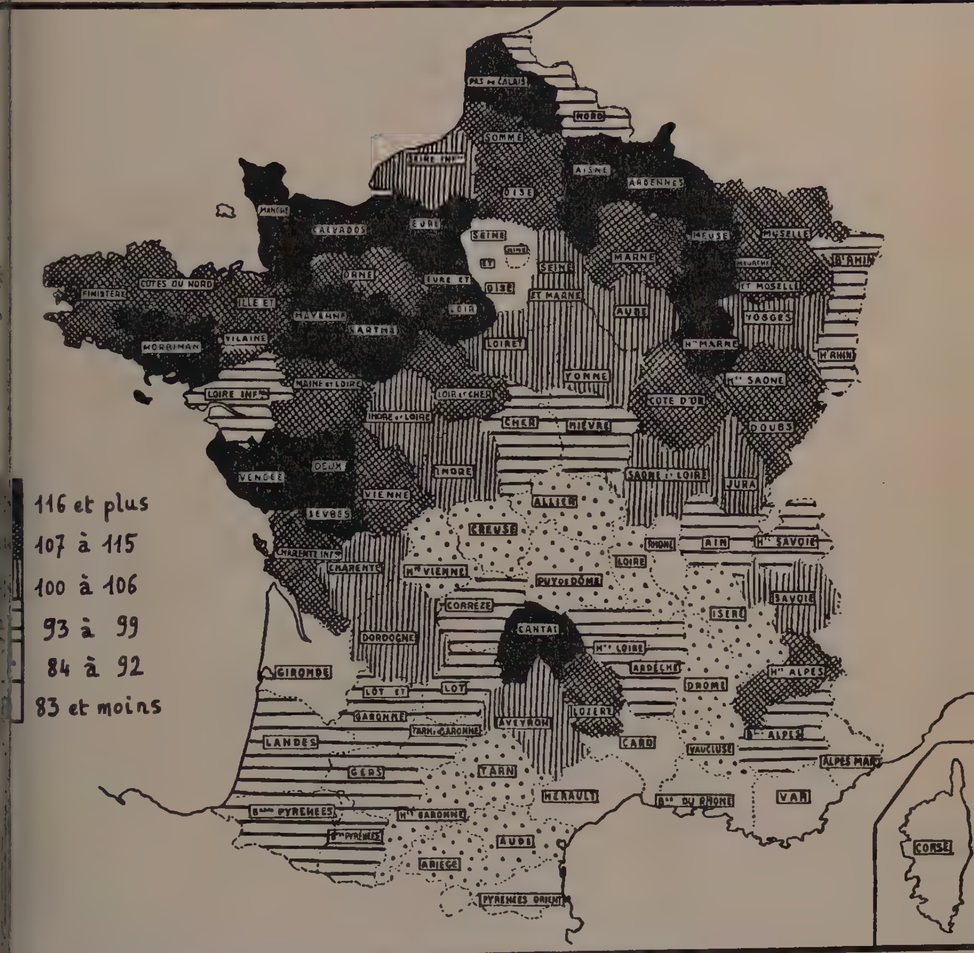
[1] Voir *Statistique du Mouvement de la Population*, 1933, 1e partie, p. lxxxiv.



Cartogramme I.—Taux Nets de Reproduction, 1910–12
(Pour 100 femmes)

3. *Taux nets de reproduction.*—Ils sont représentés par les cartogrammes I et II avec la même échelle de teintes. Les variations observées de 1910–12 à 1930–32 sont figurées dans le cartogramme III sous forme qualitative, par le cartogramme IV

sous forme quantitative: le taux naturel d'accroissement fournit en effet sous une autre forme des résultats tout à fait analogues à ceux donnés par le taux net.



CARTOGRAMME II.—TAUX NETS DE REPRODUCTION, 1930–32
(Pour 100 femmes)

On a constaté que, pour la France entière, le taux brut a diminué de 11 p. 100 entre 1910–12 et 1930–32 et que simultanément le nombre des femmes survivantes à 30 ans s'est accru de 11 p. 100. Il y a donc compensation et le taux net doit subir peu de changement: effectivement, il est passé de 94 à 93 pour 100 femmes. Mais, en vertu de la remarque précédente sur la mortalité exceptionnelle de 1911, le taux net de la France entière en 1910–12 aurait été de deux points plus élevé (96 au lieu de 94) si la mortalité infantile de 1911 avait été normale; par département, il y aurait eu majoration des taux de un à trois points suivant les cas.

DÉPARTEMENTS OÙ LES TAUX NETS DE REPRODUCTION SONT

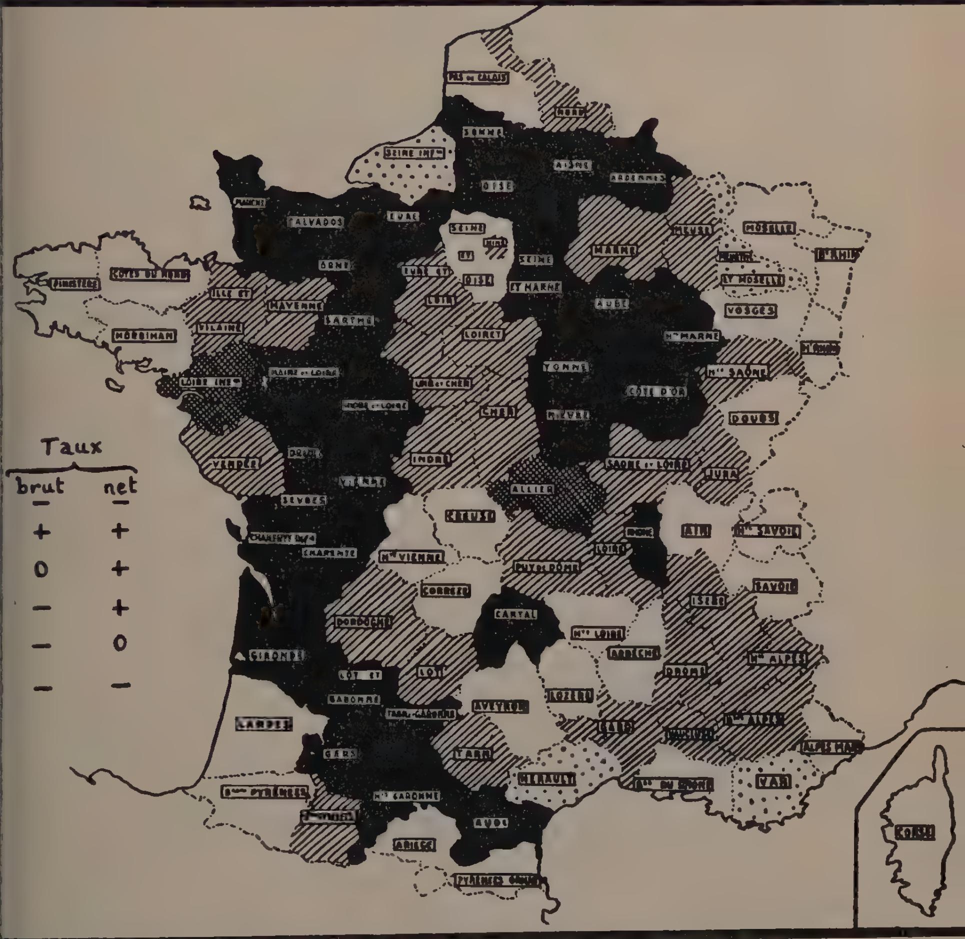
LES PLUS ÉLEVÉS

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Moselle | 140 | Manche | 124 |
| Morbihan | 135 | Pas-de-Calais | 124 |
| Finistère | 132 | Aisne | 123 |
| Pas-de-Calais | 130 | Meuse | 122 |
| Côtes-du-Nord | 126 | Cantal | 122 |
| Lozère | 122 | Vendée | 121 |
| Bas-Rhin | 118 | Morbihan | 121 |
| Vendée | 114 | Haute-Marne | 121 |
| Mayenne | 114 | Mayenne | 120 |
| Meurthe-et-Moselle | 114 | Ardennes | 119 |

LES PLUS FAIBLES

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Seine | 62 | Alpes-Maritimes | 63 |
| Rhône | 64 | Seine | 63 |
| Gironde | 72 | Bouches-du-Rhône | 70 |
| Alpes-Maritimes | 72 | Seine-et-Oise | 74 |
| Haute-Garonne | 75 | Pyrénées-Orientales | 75 |
| Lot-et-Garonne | 77 | Corse | 75 |
| Var | 78 | Rhône | 76 |
| Gers | 78 | Var | 78 |
| Gard | 79 | Hérault | 79 |
| Bouches-du-Rhône | 79 | Gard | 80 |

Pour les 31 départements dans lesquels il y a eu accroissement ou maintien du taux brut, le taux net a augmenté puisque la baisse de la mortalité est générale. Dans 28 autres, une faible baisse du taux brut a été plus que compensée par la diminution de la mortalité, d'où une légère augmentation du taux net: ces départements sont en général voisins des régions où la fécondité s'est accrue (extension des taches du cartogramme III: Ouest sauf péninsule bretonne, Centre, Est, bassin de la Garonne) ainsi que dans le Sud-Est. Le taux net de reproduction étant demeuré stationnaire dans quatre départements, il en reste 27 où il y a eu diminution (représentés en blanc sur le cartogramme III): l'importance des diminutions suffit à compenser les accroissements enregistrés dans les 59 autres circonscriptions administratives. En outre, parmi les départements où la situation s'aggrave, il s'en trouve plusieurs dont la population s'est fortement accrue et dont le poids a augmenté par rapport à l'ensemble de la France (Seine-et-Oise, Bouches-du-Rhône, Pas-de-Calais).

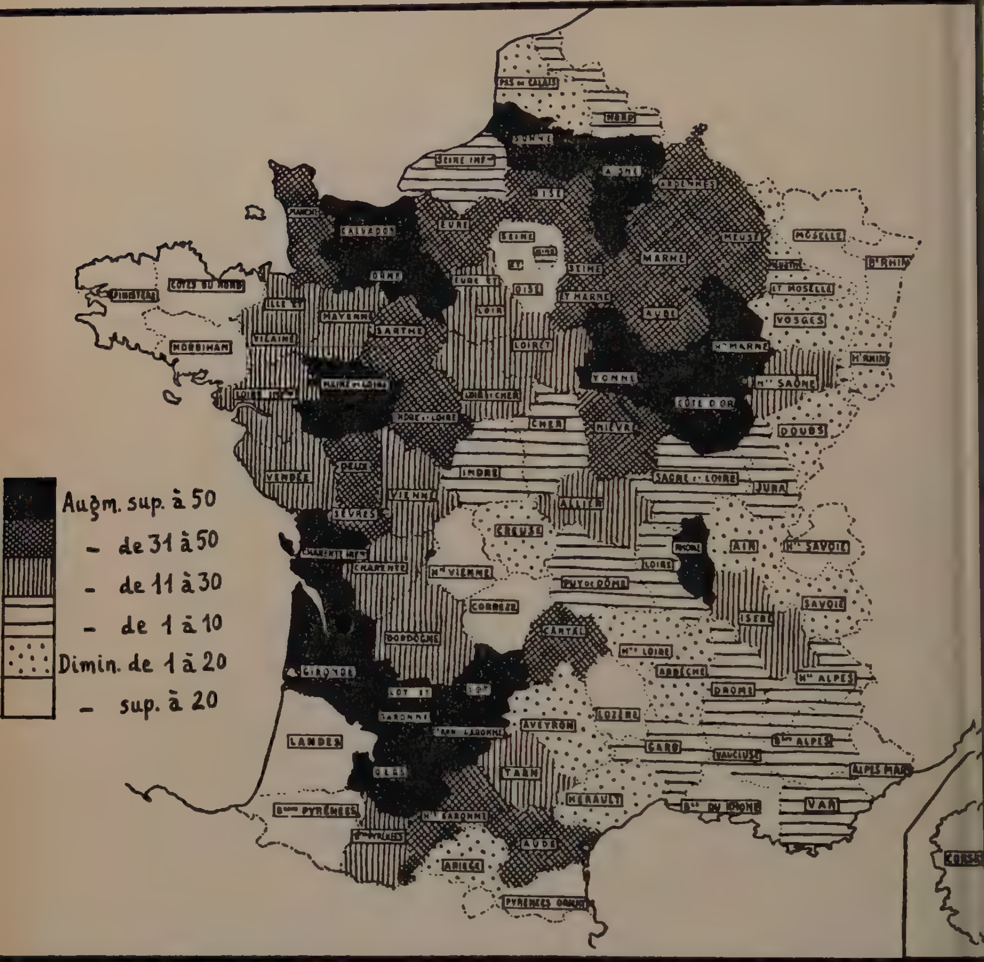


RTOGRAMME III.—Evolution des Taux de Reproduction de 1910–12 à 1930–32

4. *Intervalle de deux générations.*—Dépendant essentiellement de la fécondité et de la précocité des mariages pour le sexe féminin, il est le plus élevé dans les régions où la nuptialité est tardive (Corse, régions montagneuses) et dans celles où la fécondité est élevée (Doubs); en Bretagne, Lozère et Aveyron les deux causes agissent simultanément. Inversement, il est le plus faible là où la fécondité est basse (centres urbains) et où la nuptialité fémi-

nine est précoce (Sud-Ouest, Centre); en Gironde et Haute-Garonne les deux causes indiquées se combinent.

De 1910–12 à 1930–32, l'intervalle moyen a diminué de 28·6 ans à 28·0 ans, en raison de la diminution de la fécondité et de l'accroissement du nombre des unions précoces. Toutefois il s'est accru dans quatre départements (Eure, Gers, Lot-et-Garonne, Yonne) et est resté sans changement dans quatre autres (Aisne, Orne, Tarn, Tarn-et-Garonne): dans presque tous ces départements, la fécondité s'est accrue au cours du même laps de temps.



Cartogramme IV.—Variations du Taux Naturel d'Accroissement entre 1910–12 et 1930–32

(Pour 10,000 habitants)

## DÉPARTEMENTS OÙ L'INTERVALLE MOYEN DE DEUX GÉNÉRATIONS EST

### LE PLUS ÉLEVÉ

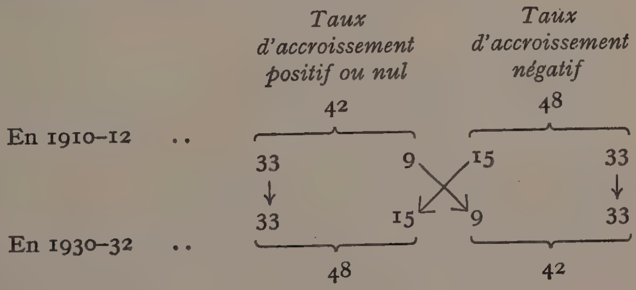
| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Corse | 31·1 | Corse | 30·8 |
| Lozère | 31·0 | Lozère | 30·6 |
| Morbihan | 30·7 | Ardèche | 29·8 |
| Côtes-du-Nord | 30·6 | Hautes-Alpes | 29·8 |
| Ardèche | 30·5 | Haute-Loire | 29·8 |
| Haute-Loire | 30·5 | Haute-Savoie | 29·7 |
| Haute-Savoie | 30·5 | Morbihan | 29·6 |
| Basses-Pyrénées | 30·3 | Côtes-du-Nord | 29·6 |
| Ille-et-Vilaine | 30·3 | Basses-Pyrénées | 29·6 |
| Finistère | 30·2 | Ille-et-Vilaine | 29·4 |

### LE PLUS FAIBLE

| 1910–12 | | 1930–32 | |
|---|---|---|---|
| Lot-et-Garonne | 27·0 | Seine | 26·8 |
| Seine | 27·1 | Allier | 26·9 |
| Gironde | 27·1 | Gironde | 26·9 |
| Allier | 27·2 | Charente Inférieure | 27·0 |
| Tarn-et-Garonne | 27·2 | Haute-Vienne | 27·0 |
| Haute-Garonne | 27·4 | Cher | 27·1 |
| Indre-et-Loire | 27·6 | Tarn-et-Garonne | 27·2 |
| Oise | 27·7 | Indre | 27·3 |
| Eure | 27·7 | Charente | 27·3 |
| Charente-Inférieure | 27·7 | Haute-Garonne | 27·3 |

5. *Taux naturel d'accroissement.*—Il fournit un classement des départements analogue en tous points à celui que donne le taux net de reproduction. Le cartogramme IV rend compte des variations de ces taux entre 1910–12 et 1930–32: en tenant compte de la remarque sur la mortalité exceptionnelle de 1911, on peut considérer que les départements recouverts de hachures horizontales se maintiennent dans une situation stationnaire; les teintes plus foncées indiquent une amélioration, les teintes plus claires une aggravation ou un déclin.

Par rapport à la position d'équilibre, le schéma ci-dessous indique les changements survenus dans la distribution des 90 départements français de 1910–12 à 1930–32:


*Taux d'accroissement positif ou nul*
*Taux d'accroissement négatif*
42
48
En 1910–12 . .
33
9
15
33
33
15
9
33
En 1930–32 . .
48
42

Les 9 départements ayant en 1910–12 un taux positif et tombés en 1930–32 en dessous de la position d'équilibre sont:

Corse, Landes, Ain, Corrèze, Basses-Pyrénées, Ardèche, Haute-Savoie, Bas-Rhin, Haut-Rhin.

Les 15 départements ayant en 1910–12 un taux d'accroissement négatif et qui en 1930–32 ont une situation favorable sont:

Orne, Somme, Marne, Charente-Inférieure, Maine-et-Loire, Seine-et-Marne, Yonne, Dordogne, Charente, Côte-d'Or, Indre-et-Loire, Loiret, Aube, Saône-et-Loire, Indre.

La signification du taux naturel d'accroissement permet de comparer sa valeur au taux brut d'excédent des naissances sur les décès:

En 1910–12, sur 42 départements ayant un taux naturel d'accroissement positif ou nul, 10 présentaient des excédents de décès: Calvados (— 27 p. 10,000 habitants), Eure (— 26), Haute-Marne (— 21), Sarthe (— 9), Jura, Manche, Oise, Haute-Savoie, Meuse, Ain;

En 1930–32, sur 48 départements ayant un taux naturel d'accroissement positif ou nul, 4 ont des excédents de décès: Yonne (— 38 pour 10,000 habitants), Indre (— 7), Côte-d'Or (— 4), Dordogne (— 2);

En 1910–12, sur 48 départements ayant un taux d'accroissement négatif, 16 avaient des excédents de naissance, parmi lesquels: Nord (50 p. 10,000), Haute-Vienne (45), Alpes-Maritimes (24), Pyrénées-Orientales (24), Indre (23), Haute-Loire (21), Saône-et-Loire (13), Loire-Inférieure (12);

En 1930–32, parmi les 42 départements ayant un taux d'accroissement négatif, 10 présentent des excédents de naissance: Nord (57 p. 10,000), Haut-Rhin (49), Bas-Rhin (48), Basses-Pyrénées (21), Seine (15), Loire-Inférieure, Haute-Vienne, Haute-Savoie, Seine-et-Oise, Bouches-du-Rhône.

Les plus grandes differences entre les deux taux se rencontrent dans les départements à caractère urbain dont la composition par âge est anormale.

Remarquons enfin que dans l'ensemble des 33 départements ayant en 1910–12 et en 1930–32 un taux naturel d'accroissement *négatif*, la population a évolué de la manière suivante:

| | |
|---|---|
| En 1911 .. | 18,645,157 |
| En 1931 .. | 20,241,180 |
| | + 1,596,023 soit un accroissement de 8 p. 100. |

Inversement, dans l'ensemble des 33 départements ayant en 1910–12 et en 1930–32 un taux naturel d'accroissement *positif*, la population à diminué:

En 1911 .. 13,499,267
En 1931 .. 12,828,118

— 671,149 soit une diminution de 5 p. 100,

résultat qui laisse apparaître l'importance des mouvements migratoires et montre le soin qu'il convient d'apporter à l'examen critique des données élémentaires relatives à la population.

En résumé, au cours de la période étudiée, la diminution considérable de la mortalité dans les premières années de la vie a presque pu équilibrer dans l'ensemble la baisse de la fécondité: on enregistre même dans les deux tiers des départements un accroissement des taux nets de reproduction, si bien que le nombre des départements en équilibre démographique est passé de 42 à 48. Mais ce résultat apparait comme dû à des circonstances assez exceptionnelles et deux constatations essentielles semblent devoir se dégager de cette étude:

1°. Avant-guerre déjà plus de la moitié des départements français avaient un taux net de reproduction déficitaire: le problème de la dénatalité, si actuel, se pose depuis fort longtemps en France, mais l'absence de données suffisantes n'a pas permis jusqu'à présent d'en préciser l'importance véritable;

2°. En 1930–32, les départements ayant un taux net de reproduction supérieur ou égal à l'unité sont au nombre de 48, mais la plupart d'entre eux sont situés dans des régions rurales assez peu peuplées, si bien que leur ensemble ne constitue que 44 p. 100 de la population française totale.

# NOTE COMPLÉMENTAIRE

*par* ADOLPHE LANDRY, *Paris*

Cette note ajoutée à l'étude si riche de M. Depoid vise à insister sur l'allure diverse que l'évolution démographique a eue dans les départements français entre 1910–12 et 1930–32 — je dirai, pour simplifier, entre 1911 et 1931. Ce ne sont pas seulement des inégalités qui se manifestent dans les variations de la reproduction nette et de la reproduction brute, mais une divergence de tendances.

La reproduction nette, dans l'intervalle considéré, a augmenté de plus de 10 % dans 23 départements, et diminué de plus de 10 % dans 9 — en mettant de côté, pour les raisons que M. Depoid a indiquées, la Corse, ainsi que la Moselle et le Bas-Rhin. Le tableau ci-dessous donne les pourcentages de hausse supérieurs à 20, et les pourcentages de baisse supérieurs à 10.

| | | | |
|---|---|---|---|
| Yonne | + 25 | Pyrénées-Orientales | — 19 |
| Lot-et-Garonne | + 25 | Finistère | — 19 |
| Côte-d'Or | + 24 | Basses-Pyrénées | — 14 |
| Gers | + 23 | Alpes-Maritimes | — 13 |
| Maine-et-Loire | + 21 | Haute-Savoie | — 12 |
| | | Haute-Vienne | — 12 |
| | | Landes | — 11 |
| | | Bouches-du-Rhône | — 11 |
| | | Morbihan | — 10 |

La reproduction résulte essentiellement de la fécondité, mais elle est réduite par la mortalité qui frappe les femmes — puisque c'est par rapport à celles-ci que la reproduction est calculée — depuis la naissance jusqu'à la fin de l'âge de la procréation.

Le deuxième des facteurs ainsi distingués a sa mesure dans l'écart existant entre la reproduction brute et la reproduction nette; M. Depoid a montré qu'on pouvait, pratiquement, le mesurer d'après la proportion des pertes qu'une classe féminine subit de la naissance à l'âge de 30 ans.

Ce facteur a joué en France, dans la période 1911–31, un rôle important, puisque le nombre des femmes devant survivre à l'âge de 30 ans a été élevé de 750 à 834; agissant seule, une telle diminution de la mortalité eût accru la reproduction nette de 11 %. Le remarque qu'il y a lieu de formuler à ce propos, c'est que, si la mortalité doit, comme il est tout à fait probable, continuer à diminuer, l'amélioration obtenue de 1911 à 1931 ne pourra cependant pas se poursuivre très loin: remarque évidente, mais utile, néanmoins, à énoncer, car il y a des vérités d'évidence qu'on est souvent porté à perdre de vue. La mortalité des Landes en 1931 destinait 117 filles seulement à mourir avant 30 ans, sur 1,000 venant du monde: la marge, ainsi, sur laquelle on peut gagner est devenue étroite; et il ne saurait être question de la supprimer entièrement.

Le facteur le plus important est la fécondité, autrement dit la reproduction brute, parce que celle-ci est susceptible à la fois de descendre et de monter considérablement.

La reproduction brute a baissé, de 1911 à 1931, dans le plus grand nombre des départements français; elle a baissé de plus de 10 % dans 34 départements — sans compter la Corse, la Moselle, le Bas-Rhin et le Haut-Rhin. Mais elle a haussé, comme on l'a vu, dans 29 départements. Le tableau ci-dessous donne les départements où la baisse a dépassé 20 %, et ceux où il y a eu une hausse de plus de 5 %.

| | | | |
|---|---|---|---|
| Pyrénées-Orientales | — 32 | Gers | + 16 |
| Finistère | — 29 | Yonne | + 15 |
| Alpes-Maritimes | — 26 | Lot-et-Garonne | + 15 |
| Bouches-du-Rhône | — 25 | Maine-et-Loire | + 13 |
| Lozère | — 24 | Côte-d'Or | + 11 |
| Haute-Savoie | — 21 | Haute-Marne | + 11 |
| Basses-Pyrénées | — 20 | Tarn-et-Garonne | + 10 |
| Seine-et-Oise | — 20 | Charente-Inférieure | + 9 |
| | | Gironde | + 9 |
| | | Rhône | + 8 |
| | | Indre-et-Loire | + 8 |
| | | Orne | + 7 |
| | | Aisne | + 6 |

On peut constater que, parmi les relèvements indiqués, il en est qui sont loin d'être insignifiants; et si ces relèvements apparaissent, dans le Gers, le Lot-et-Garonne, le Tarn-et-Garonne, comme pouvant être dus, en totalité ou en partie, à l'arrivée d'un élément étranger plus prolifique que la population indigène, ailleurs cette explication n'est pas de mise. Le fait ainsi souligné mérite, me semble-t-il, de retenir l'attention.

Dans l'ancienne France, il y a un siècle et demi, j'ai calculé que, compte non tenu des mortalités exceptionnelles, la reproduction nette était de l'ordre de 1·2, et que la reproduction brute dépassait 2·6. La révolution démographique — comme j'ai cru devoir l'appeler — est venue. La reproduction brute, en 1931, n'était plus en France que de 1·1. Mais si dans telles parties de la France cette reproduction brute a pu, tout récemment, se relever en vingt ans de 10, voire de 15 %, cela paraît marquer que la marche de la "révolution démographique" n'est pas une chose fatale, que la pratique de la restriction des naissances dans le mariage, qui est la grande caractéristique de la démographie contemporaine, n'a pas pour conséquence inéluctable la baisse continue et indéfinie de la fécondité.

# JAPANESE EMIGRATION TO LATIN AMERICA

*By* J. F. NORMANO.

## I. HISTORICAL SKETCH

Modern Japan is a newcomer in the world picture, and Japanese emigration is a recent phenomenon. In the year 1637 the Shogun issued the famous decree forbidding Europeans to land on the shores of Japan, and also forbidding Japanese subjects—under pain of death—to leave the country; furthermore, the decree prohibited the building of any ship exceeding fifty tons. Japan was thus completely isolated from the rest of the world. This autarchic policy of seclusion led of necessity to the decline of seafaring and put an end to freedom of movement in and out of Japan.

The entire period of Tokugawa (1638–1868) was dominated by a policy of exclusion and inclusion. Of course, isolated cases of illegal emigration took place in an earlier period. Thus we know that a small Japanese colony was established on the Philippine Islands in the seventeenth century.

The change of policy resulting from the Meiji restoration led to the beginning of Japanese emigration, and in 1869 the first emigrants—153 in all—left Japan for the sugar plantations of Hawaii under a contract concluded between the Japanese Government and the Hawaiian authorities.

The new freedom of emigration did not, however, stimulate the Japanese. Between 1868 and 1875 there were issued 4,637 passports to those going abroad. Of this number, 596 were for the United States, 547 for European countries, 1,965 for Korea, and 1,214 for China; the remaining 315 were for the other countries.[1]

The first wave of Japanese emigration to the countries of Western civilization was known as that of "schoolboys," consisting mostly of Japanese students. The emigration to China and Korea, which occurred in the first twenty years of the Meiji period, was the beginning of the occasional, individual type of emigration. These emigrants were christened "*dekasegi*"—birds of passage.

The next decade witnessed the transfer of 20,000 Japanese to Hawaii under governmental contract—an emigration practically insisted upon by the Hawaiian Sugar Planters' Association. A stream of Japanese followed this start, which resulted in the formation of large Japanese settlements on the Pacific coast of the United States and Canada.

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[1] *International Migrations*, edited by W. F. Wilcox, National Bureau for Economic Research, New York, 1929, vol. i, pp. 934–35.

From the beginning the natural direction of the emigration movement was indicated geographically, but its course has been altered by economic motives and legal restrictions.

A group of islands between three continents, Japan geographically gravitated to Asia. But the economic conditions of that continent were not attractive enough for the Japanese, who, accustomed to a relatively higher standard of living, were unable and unwilling to compete with the cheap Asiatic, especially Chinese, labour.

Economy drove the Japanese to North America. But this immigration was considered in Anglo-Saxon countries of this part of the world as a labour-dumping phenomenon. Anglo-Saxon Australia also refused to become a haven for Japanese emigrants. The only door which still remained open on the Pacific coast was the Latin part of the American continent.

This part of the world, according to many hypotheses, was not unknown to Japan in pre-Columbian time. Even in historical time the intercourse between Latin America and Japan has long been established. For geographical reasons it was the Pacific coast of Spanish America, and not Portuguese America on the Atlantic, which first attracted Japanese attention. It is amusing to remember that the Japanese were anxious in the sixteenth century to "open" New Spain for trade, that at the beginning of the seventeenth century the Spanish fleet touched regularly at the Japanese port Uraga, that occasionally at that period Japan and Mexico exchanged missions and products. During the colonial period Mexico was an important transit region for trade between Asia and Europe, particularly Spain. Mexico was noticeably influenced by Asia at that time, as shown in its furniture, textiles, embroideries, ivories, metal work, and other things, the influence of Chinese ceramics being especially notable in the colouring and decoration of Mexican ceramics, still noted to-day in the famous Mexican ceramics known as Talaveru.[1]

The Japanese shared at that period the European eagerness for gold. This is demonstrated by the fact that the first relations between Japan and Mexico were stimulated by gold.[1]

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[1] Comp. Dr. Manuel Gamío, *Commentaries of the Indo-Iberic countries of the Pacific* (Mimeographed report for the Kyoto conference of the Institute of Pacific Relations in 1929).

When Tokugawa Iyeasu, upon suggestion of a Franciscan, Fray Jeronimo, became interested in getting gold from Mexico, the monopoly of Sevilla opposed these attempts as it opposed any other foreign commercial relations with Spanish America. The history of these early relations is an exciting chapter in early diplomacy and business, bringing to mind sometimes the international relations of the ancient world.[2]

The repeated attempts of Japan to bring the countries on the opposite side of the Pacific Ocean into commercial relations at the end of the sixteenth and the beginning of the seventeenth century—before the years of seclusion—were eventually forgotten. Only after the Meiji restoration did Japan, being opened to the outside world, and being of a mind to join the outside world, begin again to give attention to Latin America.

But even in modern history Europeanized Japan has until recently been in touch mainly only with Spanish America—the Pacific coast from Mexico to Chile—and not with Portuguese America on the Atlantic. We can trace trade relations between Peru and Japan from 1878 on. We know that the first treaty signed by Japan on an equal basis with a white nation was that with Mexico in 1888. The first Latin American country visited by Japanese immigrants was Mexico in the 'eighties. The first organized emigration of Japanese labourers to Latin America was directed toward Peru in 1899. The first Japanese steamship line to Latin America was the Toyo Kisen Kaisha's route to Peru, and the second to Mexico in 1910.

All the intercourse between Spanish America and Japan in the last quarter of the nineteenth and the beginning of the twentieth century possessed the same episodic character as did relations before the seclusion period—isolated attempts, occasional transactions, but of course more frequent than under Tokugawas. The initiative belonged at that earlier period rather to Spanish America, as the newly independent growing American republics suffered from under-population. The emancipation of slaves in some of the countries increased the shortage of labour, and in the search for workers they turned their eyes toward Asia as a source of cheap labour. The Chinese responded so eagerly that some of the Spanish American countries began to play with the idea of importing Japanese labourers.

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[1] Spanish American precious metals played an exceedingly important role not only in European, but also in Asiatic economic history. We have to remember that the Mexican peso became the national money of China, India, the Straits Settlements, and almost the entire Pacific basin.

[2] Comp. Ortega, *Historical note on political and commercial relations between Mexico and Japan in the Seventeenth century*, Mexico, 1879; Zelia Nutell, *The earliest historical relations between Mexico and Japan*, Berkeley, 1906; Najiro Murukami, *Japan's early attempts to establish commercial relations with Mexico* in *The Pacific Ocean in History*, N.Y., 1917.

From time to time we find isolated attempts to organize close trade relations with Japan. One of the most interesting episodes was the recommendation given to the Mexican Government by the scholar Díaz F. Covarrubias, who went in 1874 to Japan at the head of an astronomic mission. Covarrubias extolled the quality of Japanese articles, and advised replacing similar European manufactures with them.[1] Portuguese America also turned attention to the possibility of importing Japanese labour.

The quest for Asiatic labour in Latin America at that time is vividly reminiscent of the British Empire during the nineteenth century. The development of plantation enterprises coincidental with the abolition of slavery throughout the British Empire in 1833 was the direct cause of the large-scale migrations of Asiatic workers—mostly from China and India. We find Chinese coolies in Cuba, Peru, Chile, as early as the end of the 'thirties. The Chinese found their way to the goldfields of California about the middle of the nineteenth century, when Japan was still in the period of seclusion. But even after the Meiji restoration in the nineteenth century Japan was, generally speaking, not open to these suggestions. When emigration from Japan was first allowed it went through short periods of single "schoolboy" travels and isolated *dekasegi* adventures. Internal colonization of the island Hokkaido was at that period of more importance than emigration. The first migrations from Japan on a larger scale started in the 'eighties to Korea, China, Formosa, Hawaii, California, Canada, and occasionally Mexico. Only the Japanese emigration to Hawaii, stimulated and organized by the sugar producers, is to be compared with the experiments with other Asiatic workers. The more distant and less familiar parts of the American continent did not attract Japanese emigration. The first emigrants preferred the neighbouring Asiatic regions, or were seduced by the rumours of a new El Dorado on the Pacific coast of Anglo-Saxon America.

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[1] *Viaje de la Comisión Astronomica Mexicana al Japón*, Mexico, 1876.

But in this part of the world Japanese immigration was arrested when it showed for the first time signs of regularity. The policy of the United States directed the stream of Japanese emigration to Latin America, for, deprived of the possibility of entering the United States, the most natural thing was to settle in the neighbouring regions.

Japanese emigration to Spanish America in the nineteenth century was of an incidental character. Spanish America did not become acquainted with the schoolboy type of Japanese immigrants, but was occasionally the destination of the *dekasegi* type —especially Mexico and Central America; but almost the entire emigration to Southern Spanish America began with contract labourers, and was directed toward Peru. Later on, after the clash in California, insignificant attempts were made to send agricultural colonists to Spanish America.

More recently Japan has attempted to find an oversea home for her sons in Brazil. This emigration was based at the start of the Japanese experience in North America, but developed, as we shall see later, entirely different aspects.

## 2. FIGURES

The quantitative part of the study of Japanese emigration is theoretically simple. A complication is caused by the lack of uniformity in statistical methods applied by the Japanese and Latin American Governments, and sometimes by their technical inaccuracy. But as the purpose of this study is not an attempt at an exhaustive, meticulous description and enumeration, but an investigation of existing trends, these discrepancies and errors do not affect the general picture.

No Japanese statistics on emigration exist. We have to use figures giving the number of passports issued and returned for travel abroad. The distinctions in the character of the travellers and their economic purposes are lost in these statistics. The grouping of the countries of destination is not uniform, and varies from time to time. The balance between the figures of passports issued and passports returned is considered as representing the number of Japanese residing abroad.[1]

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[1] Ernst Grünfeld, author of one of the few books on Japanese emigration, complained about these statistics in 1913. Comp. *Die Japanische Auswanderung*, Tokyo, 1913, p. II (Supplement zu den Mitteilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens, Dd. XIV).

The natural increase in the movement of the Japanese population abroad is probably not always taken into consideration in this balance. But the generally strong reglementary type of Japanese administrative activity speaks in favour of a relative reliability of Japanese figures.

In Latin American figures, stress is seldom laid on accuracy as a strict systematization is not consistent with the general spirit of Latin American administration. Even arrivals of immigrants are usually registered in a superficial way.

For several countries where materials were available, I undertook a comparison of Japanese and corresponding Latin American figures, and found that, taking into consideration the natural time discrepancies (interval between the moment of the issue of a passport at home and the entrance into the country of immigration) and a slight co-efficient for unavoidable inaccuracy, the discrepancies are of a rather normal size.

On the other hand, censuses of population are rare and inaccurate in Latin America, and their results are usually delayed in publication.[1] These considerations resulted in the decision to base my study primarily on Japanese figures as far as was practically possible. Of course I realize that some of the *lacunae* are apt to infuriate a professional statistician.

The table on page 83 shows the stream of Japanese emigration to Latin America against the background of the total figures of Japanese emigration.

The figures demonstrate clearly the absolute quantitative unimportance of Japanese emigration as a phenomenon and the stability of its insignificance. At the same time they emphasize the growing importance of Latin America as a destination of Japanese emigrants. These figures disclose a drastic shifting of Japanese interests from the Pacific coast to the Atlantic—from Spanish to Portuguese America.

The table given on page 84 presents this trend even more clearly.

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[1] I refer to a review of statistical materials in Latin America which one of my students, Mr. Thomas S. Berry, prepared for the bibliographical study on Economic Literature on Latin America undertaken by me in 1932. See Bureau for Economic Research in Latin America, Harvard University, *The Economic Literature of Latin America*, vol. i, Harvard University Press, 1935. Appendix: Notes on the statistical sources of South America.

## DISTRIBUTION OF JAPANESE EMIGRANTS BY COUNTRIES

| Year | Japan. Total | Latin America. Total | Mexico | Brazil | Peru | Argentina | Chile | Others |
|---|---|---|---|---|---|---|---|---|
| 1900 | 16,758 | 1 | 1 | — | — | — | — | — |
| 1901 | 6,490 | 95 | 95 | — | — | — | — | — |
| 1902 | 15,919 | 83 | 83 | — | — | — | — | — |
| 1903 | 14,055 | 1,710 | 281 | — | 1,303 | 126 | — | — |
| 1904 | 14,663 | 1,261 | 1,261 | — | — | — | — | — |
| 1905 | 13,302 | 346 | 346 | — | — | — | — | — |
| 1906 | 36,124 | 6,325 | 5,068 | — | 1,257 | — | — | — |
| 1907 | 25,060 | 3,908 | 3,822 | — | 85 | 1 | — | — |
| 1908 | 10,447 | 3,679 | — | 799 | 2,880 | — | — | — |
| 1909 | 4,278 | 1,145 | 2 | 4 | 1,138 | 1 | — | — |
| 1910 | 6,951 | 1,401 | 5 | 911 | 483 | 2 | — | — |
| 1911 | 8,071 | 494 | 28 | — | 456 | 2 | 8 | — |
| 1912 | 14,912 | 3,606 | 16 | 2,859 | 714 | 16 | 1 | — |
| 1913 | 20,966 | 8,250 | 47 | 6,947 | 1,126 | 103 | 27 | — |
| 1914 | 17,974 | 4,743 | 35 | 3,526 | 1,132 | 41 | 9 | — |
| 1915 | 12,543 | 1,447 | 19 | 39 | 1,348 | 33 | 8 | — |
| 1916 | 14,586 | 1,637 | 22 | 35 | 1,429 | 135 | 15 | 1 |
| 1917 | 22,862 | 6,036 | 53 | 3,883 | 1,948 | 127 | 20 | 5 |
| 1918 | 23,574 | 7,975 | 128 | 5,956 | 1,736 | 134 | 18 | 3 |
| 1919 | 18,244 | 4,501 | 64 | 2,732 | 1,507 | 174 | 21 | 3 |
| 1920 | 13,541 | 1,922 | 53 | 970 | 836 | 42 | 16 | 5 |
| 1921 | 12,944 | 1,835 | 69 | 970 | 717 | 53 | 21 | 5 |
| 1922 | 12,879 | 1,328 | 77 | 986 | 202 | 52 | 8 | 3 |
| 1923 | 8,825 | 1,271 | 68 | 796 | 333 | 66 | 6 | 2 |
| 1924 | 13,098 | 4,478 | 76 | 3,689 | 651 | 58 | 4 | — |
| 1925 | 10,696 | — | — | 6,330 | — | — | — | — |
| 1926 | 16,184 | — | 336 | 8,407 | 1,250 | 182 | — | — |
| 1927 | 18,041 | 11,654 | 319 | 9,625 | 1,271 | 262 | 19 | 158 |
| 1928 | 19,850 | 14,216 | 353 | 12,002 | 1,410 | 387 | 13 | 51 |
| 1929 | 25,704 | — | 249 | 15,597 | 1,585 | 430 | — | — |
| 1930 | 21,829 | 15,682 | 434 | 13,741 | 831 | 489 | 40 | 147 |
| 1931 | 10,384 | 6,612 | 280 | 5,565 | 299 | 362 | 20 | 83 |
| 1932 | 19,028 | — | 149 | 15,108 | 369 | 239 | — | — |

"Other Countries" includes Bolivia, Colombia, Uruguay, and Paraguay in the data of 1924 and preceding years. Later data include Cuba, Panama.

Source:

Data for 1900–24 were taken from Ferenczi, *International Migrations*, p. 938.

Data for 1927–30 were taken from the *Résumé Statistique de L'Empire du Japon*, 1930, p. 23; 1932, p. 23.

Data for 1931–32 obtained from the Institute of Pacific Relations.

Data for 1925–26 for Brazil were taken from Brazilian sources.

## DESTINATION OF JAPANESE EMIGRANTS*

(Number of Permits for Passports Issued by the Government)

| | 1924 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 |
|---|---|---|---|---|---|---|---|---|
| Brazil | 3,689 | 8,599 | 9,625 | 12,002 | 15,597 | 13,741 | 5,565 | 15,108 |
| Philippines | 548 | 2,197 | 2,659 | 2,077 | 4,535 | 2,685 | 1,121 | 746 |
| Peru | 651 | 1,250 | 1,271 | 1,410 | 1,565 | 831 | 299 | 369 |
| Canada | 1,103 | 1,009 | 1,062 | 1,050 | 430 | 137 | 106 | 98 |
| Union of Soviet Socialist Republics | 329 | 631 | 896 | 870 | 884 | 1,513 | 1,235 | 1,096 |
| United States (Continental)† | 4,064 | 344 | 370 | 306 | 236 | — | — | — |
| Hawaii† | 2,163 | 636 | 526 | 265 | 119 | — | — | — |
| Straits Settlements | 152 | 402 | 475 | 420 | 513 | 835 | 560 | 356 |
| Mexico | 76 | 336 | 319 | 353 | 249 | 434 | 280 | 149 |
| Argentine | 58 | 182 | 262 | 387 | 430 | 389 | 362 | 239 |
| Netherlands East Indies | 75 | 226 | 248 | 191 | 507 | 558 | 442 | 533 |
| Australia and New Zealand | 112 | 139 | 129 | 270 | 277 | 75 | 34 | 92 |
| Others | — | — | — | — | — | — | — | — |
| Total | 13,098 | 18,184 | 18,041 | 19,850 | 25,704 | 21,704 | 10,384 | 19,028 |

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* Figures obtained from the Japanese Consulate-General, New York.

† The absence of figures for the United States and Hawaii for 1930–32 is accounted for by the change in the Foreign Passport Regulations of Japan on May 20, 1929, to the effect that all travellers leaving Japan for the United States, Alaska, Hawaii, and Guam should be henceforth classified as "non-emigrants" regardless of their class and purpose in leaving Japan.

It is quite interesting to examine the results of Japanese migration to Latin America. For this purpose it is necessary to study the figures of Japanese population in this part of the world.

### JAPANESE RESIDENTS ABROAD

| | 1931 | 1932 |
|---|---|---|
| Mexico .. .. .. .. .. | 5,930 | 5,824 |
| Cuba .. .. .. .. .. | 764 | 754 |
| Panama .. .. .. .. | 306 | 330 |
| Brazil .. .. .. .. .. | 119,740 | 132,699 |
| Peru .. .. .. .. .. | 20,650 | 21,141 |
| Argentina .. .. .. .. | 4,846 | 5,124 |
| Chile .. .. .. .. .. | 629 | 625 |
| Bolivia .. .. .. .. .. | 628 | 599 |
| Uruguay .. .. .. .. | 29 | 36 |
| Paraguay .. .. .. .. | 12 | 10 |
| Colombia .. .. .. .. | 132 | 141 |
| Venezuela .. .. .. .. | 12 | 12 |

Source: 1931: *Résumé Statistique de L'Empire du Japon.*
1932: Tokyo Statistical Society.

### JAPANESE RESIDENTS ABROAD

SOUTH AMERICA

| Year | Total | Male | Female |
|---|---|---|---|
| Dec. 31, 1900 .. | *Dec. 31 748 | 738 | 10 |
| 1915 .. | †June 30 23,221 | ** 13,505 7,933 | 1,783 |
| 1920 .. | ‡3 Oct. 1 47,524 | 30,258 | 17,266 |
| 1925 .. | §Oct. 1 64,203 | 38,249 | 25,954 |
| 1930 .. | ‖Oct. 1 142,514 | 81,450 | 61,064 |

LATIN AMERICA

| | | | |
|---|---|---|---|
| Dec. 31, 1900 .. | 793 | 781 | 12 |
| 1915 .. | June 30 25,958 | ** 13,505 10,505 | 1,948 |
| 1920 .. | 47,749 | 32,388 | 17,559 |
| 1925 .. | 68,685 | 41,384 | 27,301 |
| 1930 .. | 149,495 | 86,054 | 63,441 |

** S.I.(Br.) = Sex Unknown. These are all in Brazil.
* M., Br., Pe.
† M., Br., Pe., Bo., A., Ch.
‡ M., Br., Pe., Bo., A., Ch., Pan. } LATIN AMERICA
§ M., Br., Pe., Bo., A., Ch., Pan., Par., U., Cu.
‖ M., Br., Pe., Bo., A., Ch., Pan., Par., U., Cu., Co.
SOUTH AMERICA excludes Panama, Mexico, and Cuba.

## JAPANESE RESIDENTS ABROAD—*continued*

### Mexico

| Year | Total | Male | Female |
|---|---|---|---|
| Dec. 31, 1900 .. | 45 | 43 | 2 |
| 1915 .. | 2,737 | 2,572 | 165 |
| 1920 .. | 2,198 | 1,925 | 273 |
| 1925 .. | 3,632 | 2,434 | 1,200 |
| 1930 .. | 5,832 | 3,749 | 2,083 |

### Brazil

| | | | |
|---|---|---|---|
| Dec. 31, 1900 .. | 9 | 6 | 3 |
| 1915 .. | *13,505 (2,460) | (1,687) | (773) |
| 1920 .. | 34,208 | 19,860 | 14,348 |
| 1925 .. | 49,400 | 27,336 | 22,064 |
| 1930 .. | 116,647 | 64,346 | 52,301 |

### Peru

| | | | |
|---|---|---|---|
| Dec. 31, 1900 .. | 694 | 689 | 5 |
| 1915 .. | 5,979 | 5,134 | 845 |
| 1920 .. | 10,200 | 7,748 | 2,452 |
| 1925 .. | 10,969 | 7,874 | 3,095 |
| 1930 .. | 20,535 | 13,200 | 7,335 |

### Bolivia

| | | | |
|---|---|---|---|
| Dec. 31, 1900 .. | — | — | — |
| 1915 .. | 69 | 65 | 4 |
| 1920 .. | 674 | 642 | 32 |
| 1925 .. | 657 | 551 | 106 |
| 1930 .. | 551 | 390 | 161 |

### Argentina

| | | | |
|---|---|---|---|
| Dec. 31, 1900 .. | — | — | — |
| 1915 .. | 903 | 761 | 142 |
| 1920 .. | 1,958 | 1,570 | 388 |
| 1925 .. | 2,609 | 2,044 | 565 |
| 1930 .. | 4,027 | 2,959 | 1,068 |

* S.I. = Sex Unknown.

## JAPANESE RESIDENTS ABROAD—*continued*

### CHILE

| Year | Total | Male | Female |
|---|---|---|---|
| Dec. 31, 1900 .. | — | — | — |
| 1915 .. | 305 | 286 | 19 |
| 1920 .. | 484 | 438 | 46 |
| 1925 .. | 556 | 432 | 124 |
| 1930 .. | 710 | 524 | 186 |

### CUBA

| | | | |
|---|---|---|---|
| Dec. 31, 1900 .. | — | — | — |
| 1915 .. | — | — | — |
| 1920 .. | — | — | — |
| 1925 .. | 636 | 533 | 103 |
| 1930 .. | 787 | 595 | 192 |

These figures, though still quite small, divulge, nevertheless, a fast growth in South America, especially in Brazil, and a parallel decline of Japanese immigration in the Latin American countries on the northern part of the continent. They show also that the speed of the growth became rather significant after 1924, and that particularly in the case of Brazil we are confronted with a dynamic movement. I discussed this matter some time ago in *Pacific Affairs*,[1] and tried to present the evidence that the centre of gravity of Japanese emigration shifted from the Pacific to the Atlantic, from Spanish America to Portuguese America.

The most recent Brazilian data, given by Brazilian sources, speak of 200,000 Japanese in Brazil.

Figures show that Japanese emigration to Brazil is still of no definite importance; but the speed of the process since 1924, as well as its dynamic character, is significant.

The shifting of the destination of Japanese migration from North to South America has resulted in a drastic dislocation of Japanese centres on the American continent.[2]

A quantitative analysis of Japanese population abroad confirms the increasingly important role of Latin (and especially

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[1] March 1934.

[2] The data for 1913 are taken from the *Japan Year Book*, 1915, pp. 38–9; for 1928, *Japan Year Book*, 1931, pp. 58–9.

South) America in the, as a whole, relatively insignificant Japanese emigration movement.

| | 1913 | 1928 |
|---|---|---|
| North America .. | 319,238 | 169,569 |
| South America .. | 16,000 | 98,037 |

Mr. J. Kavada, the Japanese Under-Secretary of Oversea Affairs, recently gave the number of Japanese residing abroad in 1931 as 759,131. Of these, the distribution was as follows:

225,000 in Manchuria and Khungtong.
99,000 in the United States.
120,000 in Hawaii.
116,000 in Brazil.
20,000 in Peru.[1]

### 3A. EMIGRATION LEGISLATION IN JAPAN

Living still in a world of *laissez-faire* ideas, we consider the human right to change the domicile and migrate as a natural one. We are likely to forget that freedom of movement was restricted in Europe prior to the Industrial Revolution; we disregard the fact that this freedom has not existed in many countries of Western civilization since 1914. Freedom of movement was contemporaneous with the historical period of *laissez-faire*, was a part of it.

Japan has never known a true *laissez-faire* period. From the mercantilistic paternalism of Tokugawa, Japan jumped to the enlightened mercantilism of Meiji, which has since developed into her strong neomercantilistic policy. Correspondingly the history of Japanese migration legislation is a story of restrictions and regulations.

As mentioned above, not until the Meiji restoration did a relative freedom of migration appear. Only since this new period have internal migrations begun on a larger scale.

In 1869 a special Colonization Department was created which took charge of the emigration of the natives to the island of Hokkaido.[2] But legally emigration abroad was impossible until

[1] "Situation de l'émigration Japonaise" in *Revue Economique Internationale*, June 1933.

[2] It is interesting that this colonization was based on the old village community institution.

1871. Legislation to permit leaving the country was radical and revolutionary. It was intended only for studies abroad, but the Japanese began to emigrate to labour abroad.

The period of migration freedom of the "schoolboys" and *dekasegi* was short. The year 1886 marks the beginning of new migration legislation. Each Japanese was required to register in his native prefecture, which he could leave only by permission of the authorities.

Soon new restrictions were introduced by the Emigration Protection Law of 1896, revised in 1907 and 1929.

The new system required authorization of emigration by authorities and responsible sureties for the emigrants at home. The last regulation was rescinded in principle in May 1929, but the governors of prefectures still retain the right to require sureties in cases where they deem it necessary.

Since the 'nineties the Japanese Government has voluntarily intervened in the organization of emigration, being forced to so so later on by political considerations. The Under-Secretary, Mr. Kawaki, speaking of Japanese emigration, admitted recently: "Le gouvernement se chargant de rôle du guide."[1] This principle has been fully applied to the emigration to Latin America.

## 3B. IMMIGRATION LEGISLATION IN LATIN AMERICA

The general spirit of the immigration policy of the Latin American countries from the time of their independence up to the war was one of encouragement. Economic motives stimulated this policy as the small population of the continent arrested the development of its resources. This policy was typified in the famous decree on immigration issued in Peru by Felipe Santiago Salavery in 1835. According to this decree, "every individual from any point of the globe is a citizen of Peru from the moment when, entering its (Peru's) territory, he wishes to be inscribed in the civil Register." In the middle of the nineteenth century the great Argentine, J. B. Alberdi, expressed the essence of this immigration policy of Latin America in the words: "To govern is to populate."

Accordingly these countries never knew restrictions of immigration prior to the World War. The demand for labour, never satisfied, led to special efforts to attract Asiatic immigrants.

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[1] *Op. cit.*, p. 491.

All over Latin America, all the way from the literary to the administrative fields, the possibilities of importing Asiatic labour were discussed. The fight against the African slave trade encouraged the importation of Chinese coolies. During the nineteenth century the Asiatic labourer became a familiar figure in Latin American economy.

Special attention was given to Japanese immigration in the nineteenth century. In Mexico the aforementioned Diaz Covarrubias as early as 1874 advocated the immigration of Japanese to Mexico. But only the beginning of the twentieth century witnessed a Japanese response to this desire. Japanese emigration to Spanish America was incidental and quantitatively negligible until the anti-Japanese policy in the United States forced Japan to look for new destinations for her sons. Nationalistic pride awakened by the victory over Russia stimulated the desire for expansion. A small emigration to Mexico and Peru had already taken place at that period. The end of the first decade of the present century found Japanese missions and agents all over Spanish America studying and preparing the field for emigration. But Spanish America has not kept its welcoming attitude.

Initiation of immigration legislation in the United States, racial prejudice, psychological resentment, resulting from Japan's victories, local discontent with the growth of the Asiatic population, the war and later economic disturbances, and the growth of economic nationalism—all these factors brought about a change in the second quarter of the twentieth century in the immigration policy of Spanish America where most of the countries after the war introduced immigration restrictions.

Specific anti-Asiatic restrictions originated in the countries of Central America (Costa Rica in 1896, Guatemala in 1909), and have been introduced more recently in some of the South American Republics, such as Paraguay and Colombia. But almost all Spanish South America is at present under the régime of a universal (Argentina) or arbitrary (Uruguay) restriction of immigration. It is true that the restrictions of Japanese immigration are not so universal as those against the Chinese, and that in some of the countries the administration prefers to avoid formal racial discrimination, imitating the practice of the British Dominions. Nevertheless, Spanish America can no longer be considered as an absolutely free haven for Japanese immigrants.

The attitude of Portuguese America toward Asiatic, and particularly Japanese, immigration was analogous to that of Spanish America prior to the World War.

The crisis in the labour market in coffee production caused the Brazilian Government especially to welcome the first steps of Japanese immigration in the twentieth century. The constant petitions of the coffee-*fazendeiros* and their insistence led to the organized importation of Japanese contract labourers. Later changes have strengthened this policy.

Mussolini's new emigration policy, depriving Brazil of Italians, resulted in a new shock to the Brazilian labour market, and stimulated even more the open-door policy toward the Japanese. Thus after the World War Brazil did not join the restrictive policy of several Spanish American republics, but continued the outspoken encouraging policy toward Japanese immigration. Of course, the instructions of June 30, 1925, gave to the Director of Servico Geral do Povoamento do Solo the right to suspend immigration, or limit it temporarily, but no use has been made of this power. Since January 1931 the only immigrants allowed to land have been those whose entry has been solicited by the Federal Interventor, through the intermediary of the Minister of Labour, and those who hold a note of call (*bilhete de chamada*); also agriculturists who have satisfied certain requirements. Casual migrants must be in possession of an amount equivalent to three contos of reis.

Obviously these restrictions did not affect the Japanese arriving under special contract and concession agreements. Even more: the Brazilian Government willingly consented to increase the number of Japanese immigrants.

It is true that the immigration legislation of July 1934 voted by the Constituent Assembly restricted the entry of immigrants annually to 2 per cent of the total entries of the past fifty years. This rule affects Japan more than any other country in spite of the absence of any kind of formal discrimination. But this rule did not hinder the Brazilian Government, immediately after its introduction, from admitting large numbers of Japanese colonists in exemption from this rule. Public opinion in Brazil is divided on restriction for Japanese. The chauvinistic Alberto Torres Patriotic Society regarded the clause as a victory in its campaign to bar all Japanese immigration. At the same time several Brazilian officials have made statements deprecating what they call the "short-sighted view" of the anti-Japanists. The preliminary figures for the first three months of 1935 show that several thousands have landed in Brazil, and that the new rule has been interpreted and applied rather with an outspoken benevolence. Current information from Brazil indicates that the Government intends to reopen the doors widely to Japanese immigration.

### 4. ORGANIZATION OF THE EMIGRATION IN JAPAN

After a short episode of free emigration, Japan entered the field not only of legal, but also of economic regulation of emigration. This traditional paternalistic attitude which was previously applied to contract labourers, has been extended and emphasized in the case of emigration to Spanish America, and has reached its climax in the deliberate system of preparation and organization of emigrants to Portuguese America.

Twentieth-century Japanese emigration of Latin America can be divided into two periods: (1) the *experimental* one (1906–24), and (2) the *organized* one, which was a result of the experiment. After the Russo-Japanese War the Japanese Government, as a result of events in California, turned its eyes to Latin America, and began to encourage this emigration. 1906–7 were years of propaganda directed toward Latin America in the Japanese Press. Statesmen were preaching emigration to this part of the world, and public opinion was highly in favour of this tendency. Steamship lines to Latin America were established, colonization enterprises encouraged.

This experimental period brought Japanese to the Pacific coast of Spanish America, and could be called the Pacific period of the emigration to Latin America. It was a continuation and imitation of the emigration to the United States, with the gradual addition of new principles which have since become fundamental in the recent emigration policy of Japan.

Already in this *Pacific period* we can see beginnings of new methods of organization. Most of the measures characteristic of the period after 1924 originated in the Pacific period, but in a milder, searching, experimental, embryonic form.

The period after 1924 is that of a purely governmental organization of emigration. As the experimental period marked the shifting of the emigration from Anglo-Saxon to Spanish America, so the new one marked a new shifting to Portuguese America. We may call this the *Atlantic period*.

The present system of governmental organization of Japanese emigration, that to Brazil, is the first mass-experiment in the history of Japanese emigration.

The following description of the organization of emigration to Brazil shows the distinction between the experimental and the present system and the transition from one to the other. We have to take into consideration the fact that before 1924 no special efforts were devoted to Brazil, that the measures were applied to Spanish America as well. On the other hand, the present system is applied only to emigration to Brazil, as the latter is the only one which has attained significant proportions.

The change came after the war. The Japanese War Investigating Committee included South America in its observations, and sent numerous investigators there.

Dr. Schuchart presents numerous instances of the feverish activity of various Japanese missions to Latin America during the war.[1]

The Latin American newspapers of 1916–19 are full of notes on Japanese visitors. In the spring of 1919 three trade missions visited Mexico.

Simultaneously the usual establishment of trade-promoting organization took place in Japan. The Japan-Chile Trade Association was formed at Tokyo in 1916, followed by a Latin American Japanese Society and a Japan-Mexico Society.[2] Japan took an important part in the Panama-Pacific International Exhibition in Panama,[3] organized a special industrial exhibition in Santiago de Chile, and established Japanese commercial museums in Buenos Aires and Santiago de Chile. But soon Japanese activity changed its direction.

In 1924 the Emigration Council, headed by Minister of Foreign Affairs Shidehar, sent a new mission to South America. As a result of this study Japan concentrated her emigration efforts on Brazil.

As soon as this decision was taken, the Japanese Government established a strictly centralized, rationalized management of the emigration to Brazil, initiating an organized intercontinental transplantation of human material on a scale and in a way which has never been seen before. I investigated this organization in detail in my above-mentioned study.

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[1] *Japans Rüstung für den Handelskrieg*, Berlin, 1918, p. 37.

[2] None of these organizations found it possible to supply me with the requested information. The Emigration Society, the Foreign Trade Association, and the Pan-Pacific Society in Tokyo shared this attitude.

[3] *Japan and Her Exhibits at the Panama-Pacific International Exhibition*, Tokyo, 1915. Prepared by Hakurankwai Kyokwai (Société des Expositions).

As early as 1915 the preparation of emigration began to adopt an organized form. In this year the Kaigai Kyokai (Overseas Societies) were formed in the prefectures of Hiroshima and Kumamoto, and were followed in 1918 by similar societies in other prefectures.

The Overseas Emigration Societies Act of 1927 provides for the establishment of special emigration co-operative societies (Kaigai Iju Kumiai) based on the old Japanese form of guilds. The purpose of these guilds is to prepare *group* and *not individual emigration*—spiritual as well as economic groups. The guilds assist the emigration of persons who possess some capital which they can invest in land in the country of immigration; in fact, one of their main purposes is the purchase of land in overseas countries. Since this Act came into effect, overseas emigration societies have been formed in eighteen prefectures. The total number of members of these societies reached nearly 10,000 in 1931; in one prosperous society alone the membership exceeds 1,900. A further step towards centralization took place when a federation of these societies had been formed in 1927. The Kaigai Iju Kumiai Kengokai (The Association of Oversea Emigration Partnerships) had fifty-one members, of which thirty-seven were Kaigai Iju Kumiai. This association organized several years ago the Brazil Takahoka Kumiai, which has been engaged in the acquisition of land for colonists in Brazil.

The National Federation of the Japanese emigration societies has established shops, warehouses, and dwelling-houses, sawmills, brick factories, and hospitals in Brazil. The building of new roads and bridges, surveying of new and unexploited tracks of land, etc., are also undertaken by the National Federation. I described in the above-mentioned study the supervision of the Japanese colonies in Brazil by organization from Japan, and showed that the Japanese immigrants in Brazil under the new system do not become *deracines*, but are under the constant influence of their native country. The emigration societies in Japan are the bridge between the old and new *Fatherland*.

## 5. THE PRESENT COLONIES

We have considered the quantitative part of the problem of

Japanese emigration to Latin America, and surveyed its legal aspects and administrative organization. Our next problem is a qualitative study of the phenomenon. It is not sufficient to know the arithmetical number of Japanese in Latin America to understand the importance of the movement. We must follow the Japanese into his new home and investigate his fate, his disappointments and achievements in the country of his choice.

Unfortunately we are confronted with an almost complete lack of available information on this subject. It is true that the period of observation is rather short, but no attempt at a study of Japanese colonies in Latin America has ever been made, and even the most lengthy writers on Japan in European languages devote only a few general sentences to this phenomenon. Nor have Latin American economists and Governments shown any curiosity about their Japanese countrymen. Spanish literature is practically restricted to a few pamphlets dealing chiefly with the racial or political aspects of Oriental immigration, and to my knowledge no publication on this subject exists in Portuguese.

Only a most fatiguing search and collection of occasional brief notices, incidental reports in periodicals, and a perusal of current literature in Latin America has enabled me to gain some insight into this problem, and try to reconstruct the life of Japanese emigrants in this part of the world.

The two periods of Japanese emigration to Latin America resulted in two types of immigration. The Pacific period brought to Spanish America for the most part individual and contract labourers. The Atlantic period resulted in the transplantation to Brazil of immediate or future colonists. Even encouraged and supervised by the Government, the Japanese in Spanish America did not develop group activities. The migration to Brazil is exclusively one of organized groups. This distinction in the organization of emigration resulted in the growth of numerous economically strong groups in Brazil in contrast to the smaller number of individual Japanese emigrants in Spanish America, whose fortune in their new homes depended on their own initiative and good luck.

It would be wrong to say that the Japanese did not attempt to settle as colonists in Spanish America. Such attempts have often been projected and sometimes undertaken.

Thus Mexico witnessed one of the first attempts in this direction. Dr. Ishihashi reports that about 1903 a Japanese colony was founded at Hacefula de Quimichis. Its area was 88,000 acres, on which were found some 162 Japanese families with a total population of eight hundred. Under cash-and-share tenancy these Japanese were growing tobacco, cotton, beans, onions, sugar-cane, bananas, oranges, etc., on a small scale. The average size of farms was about 7¾ acres. Farm hands were making from 50 c. to 75 c. per day in Mexican dollars.

The pecuniary advantage in that country for Japanese is thus very limited. Mr. Arakawa, the Japanese ex-Minister to Mexico, is quite right when he says, "I have realized that Japanese immigration to Mexico is not profitable."[1] Under the circumstances, it was but natural that these emigrants sought to cross the boundary lines into the United States where a far better opportunity was offered them. But that migration, like the migration from Hawaii, was stopped by the agreement of 1907 between the Japanese and American Governments. Since 1908 there has been practically no emigration of Japanese to Mexico, as the Japanese Government in pursuance of the gentlemen's agreement stopped issuing passports to those of its citizens seeking entrance into the United States or Canada except in special cases, and voluntarily applied a similar practice to those intending to go to Hawaii or Mexico.

We know of a colony organized in 1897 in the state of Chiapas, Department of Soconusco. The promoter was Mr. Yoshbumi Murota, representing Viscount Takeaki Enomoto, one-time Minister of Agriculture in the Japanese Government. We know of the foundation of a Mexican Japanese Co-operative Society. Dr. Schuchard reports several other Japanese enterprises in Mexico.[2] But none of these attempts at organization of colonies was important, only imitating blindly on a very small scale the development of Japanese emigration in neighbouring California.

Japanese immigration never achieved any importance in Mexican economic life, either quantitatively or qualitatively. The number of Japanese in Mexico is small in comparison with the Chinese, who are, after the Spanish, the most numerous aliens in Mexico. Like the Chinese, the Japanese in Mexico are agricultural labourers, or even more often, small shopkeepers in towns and villages located mainly on the coast.

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[1] Yamato Ishihashi, *Emigration from Japan and thence their Immigration into the State of California*. Thesis at Harvard University, 1913, p. 123. This thesis contains more information on our topic than the recent publication by the same author (*Japanese in the United States*, Stanford Univ. Press, 1932).

[2] *Op. cit.*, p. 41.

It is characteristic of Japanese emigration to Mexico that it became partly a transition point, a bridge to enter the United States. Dr. Ishihashi notes this point: "If the population statistics be accurate, it is interesting to note the disappearance of the majority of the emigrants as soon as they reached Mexico. I suspect that they must have entered the United States by crossing the boundaries.[1]

This "disappearance" is not only a result of their endeavour to enter the economic paradise of the United States; it is typical of the Japanese emigration to Spanish America, not organized, having no roots in the soil. The Japanese labourer does not as a rule develop into an independent farmer on Spanish American soil, but becomes urbanized as soon as he is able to give up his wage-earning.

The same holds true in Peru. Two attempts were undertaken in 1897—one by the Peruvian consul in Yokohama, the other by Morioka y Co. of Tokyo.

In 1899 the first eight hundred Japanese arrived at Callao, and several thousand were imported later at various times as contract labourers. But they usually left the plantations as soon as their savings allowed it. Ishihashi tried to explain the failure of Japanese as labourers in Peru by the fact that "the Peruvian landlords were accustomed to use slaves," and he was told "that they are extremely haughty, and the Japanese as a class are very sensitive. Friction between the two has already occurred not infrequently. The Japanese proved themselves to be impatient and unsubmissive. Their anticipation was far beyond their power of realization. They became dissatisfied, and so did their employers. Thus, though they were enthusiastically welcomed at first, Japanese are no longer looked upon favourably by the employer."[2]

I think this explanation sounds rather naïve: the cause lies not in the character of the Peruvian *fazendeiros*, and not in the sensitiveness of the Japanese, but in the fact that the Japanese do not intend to represent the cheap Asiatic labour for which the Peruvians were looking.

Most of the Japanese immigrants in Peru became urbanized. A recent writer on immigration to Peru, Dr. Mario E. del Rio, makes the statement that the Japanese immigrants "se dispersaron por las ciudades"[1] and as petty traders and shopkeepers compete with the Chinese and natives. Del Rio calls the Japanese immigration "almost as detestable as that of the congenerous Chinese, from the ethnical and moral standpoint, even though less refractory to hygiene and the actual current of culture and progress."[2]

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[1] *Op. cit.*, p. 121.

[2] *Op. cit.*, p. 88.

The well-known Peruvian writer, Clovis (Dr. Luis Varela Orbegoso), in his introduction to Mario E. del Rio's book, states that "Japan sends us her hosts, who take possession of petty commerce, invade the small industries, displace and ruin the native retail merchant."[3]

The results are no more satisfactory in other countries of Spanish America. Everywhere attempts at colonization; nowhere colonies. Wherever the Japanese entered they soon became urbanized.

There was much talk about Japanese settlements in Chile. The French Professor, Demangeon, spoke of the effort of Chile to attract Japanese immigrants: "They entice them, while at the same time they seek to limit the Chinese immigration; they establish them on small agricultural homesteads; they even hope to recruit fishermen for the archipelago at the South."[4] But the entire Japanese population amounted only to 670, according to the figures of 1930. And these few hundreds repeated exactly the picture of the Japanese in Peru. They usually live in the industrial Northern districts, in the nitrate and copper regions. A few of them are employed as fishers in the Archipelago.

But it is true that Chile has disclosed at times a genuine interest in Japanese trade and immigration. Chilean business men visited Japan as early as 1907, selling nitrates and endeavouring to develop commercial relations between the two countries, and encourage Japanese emigration to Chile.[5]

In 1908, according to Ishihashi, a contract was entered into between a Chilean railroad syndicate and a Japanese commercial house whereby the latter was to send three thousand Japanese over a period of three years to work on the syndicate's roads.[6] But no statistics have ever shown the presence of three thousand Japanese in Chile.

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[1] *La immigración y su desarrollo en el Perú*, Lima, 1929, p. 62.

[2] *Ibid.*, p. 61.

[3] *Ibid.*, p. 61.

[4] *Le declin de l'Europe*, Paris, 1920, p. 164.

[5] *U.S. Monthly Consular and Trade Reports* (Valparaiso), No. 310, March 1907.

[6] *Op. cit.*, p. 92.

The experience of the other Spanish countries of South America does not differ from that of Chile. Albert B. Martinez and M. Lewandowski report that the proposal to introduce Japanese agricultural immigrants is one item in the plan of the Japanese Government to develop the relations with Argentina.[1] The above-mentioned Demangeon speaks of a Bolivian negotiation concerning "L'establissement de plusieurs milliers de cultivateurs nippons pour mettre en valeur les terres incultes."[2] But neither in Argentina nor in Bolivia have colonies been established. The recent increase in Japanese arrivals to Argentina is accounted for by the development of commercial relations.

Japanese immigration practically does not exist in the remaining Spanish countries of South America. The information given by Dr. Francisco García Calderon (now the Peruvian Minister in Paris) that "Japanese spies have been captured in Ecuador"[3] could hardly be considered as a case of Japanese emigration any more than the fact of anti-Japanese writings by Mr. Miguel Jiménez Lopez in Colombia.[4]

The situation is entirely different in Portuguese America, but I have to refer the reader again to my study of Japanese emigration to Brazil, when I gave a description and appraisal of the present Japanese colonies in that country, and showed its rapid numeric and qualitative progress.

* * *

A review of the Japanese emigration to Latin America shows that this movement has little importance yet. This conclusion is even stronger if we consider the results of Japanese emigration to Spanish America. The absolute figures are small, and neither quantitatively nor qualitatively is the Japanese penetration of any importance. *The much-discussed "Japanese penetration" or "Japanese conquest" of Spanish America* is a political myth.

The picture changes in Portuguese America. Its most peculiar features are the speed of the movement, the dynamics of its development, and its new character in comparison with the Japanese emigration to Spanish America.

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[1] *The Argentine in the Twentieth Century*. English translation, London, 1930, p. 230.

[2] *Op. cit.*, p. 164.

[3] *Latin America*, English translation, London, 1913, p. 329.

[4] "A mass immigration of Japanese colons is not advisable from the ethnical standpoint, neither for Colombia nor generally for Indo-Iberian countries."

# LOGISTIC LAW OF GROWTH AND STRUCTURE OF INDIAN POPULATION

*By* SATYA SWAROOP *and* R. B. LAL

*All-India Institute of Hygiene and Public Health, Calcutta*

## INTRODUCTION

The study of population growth has interested thinkers from the dawn of civilization. Even among the primitive races, Carr-Saunders (1925) has shown that the fear of over-population prevailed and they resorted to artificial methods for the purpose of restricting their numbers. Ranadiv (1930) states that as early as the seventeenth century an Italian writer named Giovanni Botero called attention to the fact that population cannot maintain the same rate of increase for all time. In 1798 Malthus wrote his famous essay on the Principle of Population. It is now held that even before his work Malthus had been clearly anticipated by several other writers, not only in his fear of over-population and misery, but also in the operation of checks to population. Among these writers we may include the names of Raleigh, Wallace, Townsend, and Franklin. Malthus's work, however, was of greater importance. It marked a new stage in population discussions when attempts began to be made to formulate theories on numerical bases. Forty years later a Belgian mathematician, Verhulst, for the first time, put out a law of population growth in an exact form which he called the logistic. This law was independently rediscovered by Pearl and Reed (1920), and these authors claim that it represents the law of growth of populations of most diverse kinds, ranging from bacteria and yeast to man. They have, in their later publications (1922), (1923), presented a large amount of data collected from experimental and statistical studies to support this law. Pearl has (1925), in his book *The Biology of Population Growth*, demonstrated that human populations grow according to the same law which has been shown to be true for the growth of experimental populations of lower animals and even for the growth of body size in individual plants and animals. Thus he has shown that the law holds good when applied to the census history of the following places: Sweden, England and Wales, Hungary, Italy, Norway, Scotland, Serbia, Japan, United States of America, France, Belgium, Denmark, Java, Philippine Islands, Baltimore City, New York City, and the world as a whole. The interesting instance of a native population of Algeria which has practically covered the whole range of the logistic curve in the course of seventy-five years has also been presented in support of this law.

Various types of criticisms have been levelled against this law. Hogben (1931) has stated that the mere fact that it fits the growth curves of various countries does not confer on it the status of a law. He has also pointed out that it is not impossible to find two or more different types of curve fitting the same data equally well. The validity of the application of results yielded by controlled experiments to human populations has also been doubted.

On the other hand, Carlson (1913), Crew (1932) and other workers, have found that the curve gives a very good fit to experimental data relating to growths of various other types. Netusil (1927) has very strongly supported Pearl in the following language: "Professor Pearl has given us a report of his attempts to find the laws governing the biological evolution of population. I am quite confident in saying that his logistic curve is a real expression of such biological law. It is shown that the law expressed by the logistic curve is really governing not only the growth of population whether actual or experimental, but also all other biological processes." He quotes the work of Janish, who also, without knowing anything of Pearl's work, comes very nearly to the same conclusions on material of quite different bearing. Lotka (1925) also has supported the law by providing a rational derivation of this curve.

Whether or not the logistic curve represents the law of biological growth as claimed by Pearl, there is general agreement that the curve has been and can be employed to fit the growth curves of populations of different countries.

It has been shown mathematically by Lotka (1932) that "a population which has for an extended period of time been following the logistic law, has a definite pattern. Its demographic characteristics are not fortuitous or capricious, but conform to a type or model determined by the logistic law of growth itself." Lotka was primarily concerned with putting out the theoretical aspects of the law. For exemplifying his theoretical analysis he made use of some numerical constants from American data. He, however, did not compare the "demographic characteristics" as calculated by him with the actual vital happenings in that country. It is proposed to apply Lotka's mathematical deductions to the Indian data to see how far actual conditions can be represented.

The first question that arises is whether the Indian population has been following the logistic law for an extended period of time. We have records of only seven censuses from 1872 to 1931. The Intercensal periods have been marked by various catastrophes. For example, there have been extensive famines during the periods 1872–81, 1891–1901, and during 1911–21. The pandemic of influenza which swept the country in 1918–19 carried away about 14 millions. The country has also suffered severely from the ravages of plague. Cholera has broken out with great virulence from time to time. Epidemics of malaria and smallpox have repeatedly devastated large parts of the country. The result has been that the population increase has by no means been steady, as may be seen from Table I, taken from Vaidyanathan's Actuarial report (1931).

Migration as a disturbing factor in the growth curve of Indian population is not of much significance. The position is clearly explained by Carr-Saunders (1936) in his book on World Population thus: "When slavery was abolished in the empire a demand grew up for labour in the tropical dependencies, and this led to the emigration of Indians under indenture. The Government of India has imposed a series of restrictions upon the movement of this kind in the interests of the emigrants, and in 1915 finally prohibited emigration under indenture. The net result, therefore, of Indian emigration is that the number of Indians abroad is equal to little more than two-thirds of the average annual increase of the population of India between 1921 and 1931. Though Indian emigration has great political significance, it is numerically negligible in relation to the population problem." With regard to immigration from other countries, there were 730,562 persons enumerated at the 1931 census. This number is only 0·21 per cent of the total population and may therefore be considered to be negligible.

TABLE I.—Real Rate of Increase of Population

| Period | Percentage Increased during the Period | Period | Percentage Increased during the Period |
|---|---|---|---|
| 1872–81 | 1·5 | 1901–11 | 6·4 |
| 1881–91 | 9·6 | 1911–21 | 1·2 |
| 1891–1901 | 1·4 | 1921–31 | 10·6 |

The percentage increase has varied from 10·6 to 1·2. Whatever may be the cause of this variation, for our purpose it is important to note that we are dealing with an increasing population and therefore the logistic curve may be applicable.

The curve has, in fact, been applied to Indian data by a number of workers. Russell (1927) applied this curve to Indian census figures and found that "the equation of the growth curve fits the census figures very closely." After the 1931 census Griffith and Porter (1931) fitted this curve to census figures of Bengal and stated that "the equations give a curve of reasonable fit." Raja (1937) made use of this curve as one of the means for studying the population trend and for the purpose of making short-term predictions. He also found that "the logistic curve has given a fairly satisfactory fit." The percentage errors of fit of these authors are given below.

TABLE II.—MEAN DEVIATIONS OF THE CENSUS POPULATIONS FROM THOSE EXPECTED FROM THE LOGISTIC CURVE EXPRESSED AS PERCENTAGES OF THE EXPECTED

| Author | Figures relating to— | Period | Mean Deviations irrespective of Sign as Percentage of the Expected Figures |
|---|---|---|---|
| Russell | India | 1872–1921 | 1·50 |
| Griffith | Bengal | 1872–1931 | 0·84 |
| Porter | Bengal | 1872–1931 | 0·75 |
| Raja | India | 1872–1931 | 1·97 |

## APPLICATION OF THE LOGISTIC CURVE TO INDIAN POPULATION

In the first place it may be stated that the figures shown by the census enumerations have been substantially coloured by two important factors:

(1) Inclusion of large tracts of new areas at each census.

(2) The progressive increase in the accuracy of enumeration from census to census.

In fitting the logistic curve it was necessary, therefore, to take populations which were comparable, after making allowance for these two factors. It was decided to take for the area of study the tract enumerated in 1872 census. The table overleaf shows the census figures calculated for this area for different census years by basing the calculation on the real rate of increase when allowance is made for the two factors stated above.

TABLE III.—REAL GROWTH IN THE POPULATION OF THE AREA ENUMERATED AT THE 1872 CENSUS

| Census Year | Population | Census Year | Population |
|---|---|---|---|
| 1872 | 206,162,360 | 1911 | 247,437,521 |
| 1881 | 209,254,795 | 1921 | 250,406,771 |
| 1891 | 229,343,255 | 1931 | 276,949,889 |
| 1901 | 232,554,061 | | |

In fitting the logistic to these figures the upper limit was taken to be 600 millions. In order to avoid complications in the formulae which are given later it was thought necessary to take the lower limit as zero. This may not be strictly justified. It may, however, be seen that the logistic has, under this assumption, given a good fit and since we are not concerned with the remote past the assumption may be permitted. The relationship that should hold between the limits and the enumerated populations is that the logarithm of the function

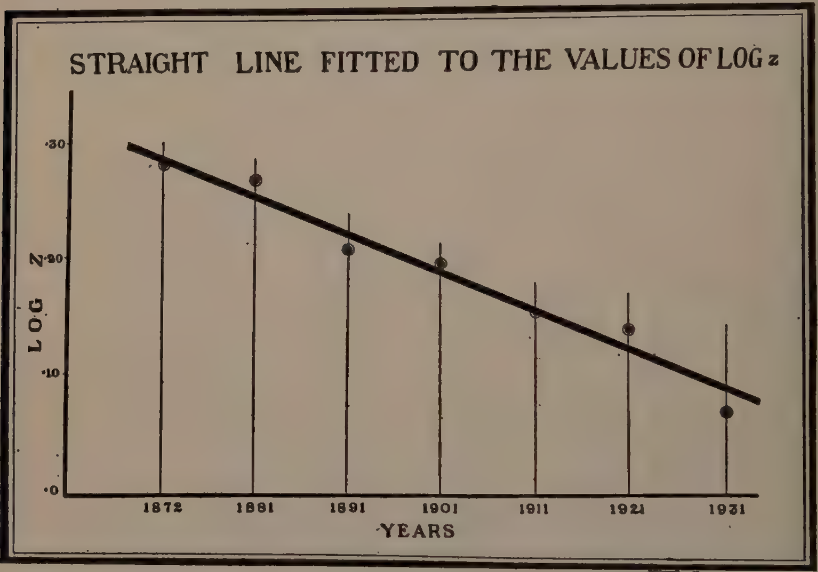

FIG. 1

$$\frac{\text{600 millions-enumerated population}}{\text{enumerated population}} = \log z \text{ (say)}$$

when plotted against time should be linear. This is shown to hold good in the diagram on page 104. The equation of the straight line fitted to these values of the logarithms by the method of least squares is $\log_{10} z = 0{\cdot}189{,}7618 - 0{\cdot}003{,}2946\,.\,t$, where $t$ denotes time, in year as unit, measured from 1901 as the origin.

The equation of the logistic curve which has been fitted to the data of Table III is $y = \dfrac{600{,}000{,}000}{1 + e^{0\cdot 436{,}9426\ -\ 0\cdot 007{,}5860\,.\,t}}$. The point of inflexion of this curve falls at the year 1958·598,5491,

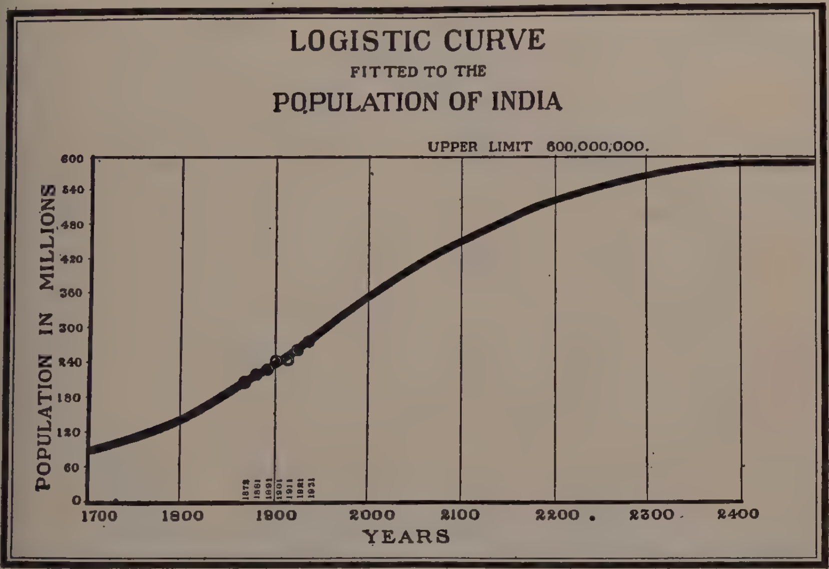

FIG. 2

and if the origin is transferred to this point the equation simplifies to

$$y = \frac{600{,}000{,}000}{1 + e^{-0\cdot 007{,}5860\,.\,t}}$$

The standard interval (Yule, 1925) is approximately 132 years The table on page 106 gives the populations calculated from this curve for varying intervals for the period 1400 to 2400. Census populations are also shown for purposes of comparison.

The mean deviation of the census figures from those expected is only 1·782 per cent. of the expected populations. Figure 2 brings out the comparison of the expected with the census populations and also shows the curve of growth of Indian population.

TABLE IV.—POPULATIONS CALCULATED FROM THE LOGISTIC CURVE FOR VARIOUS VALUES OF *t* AND THE CENSUS POPULATIONS FOR COMPARISON

| Year | Populations Calculated from the Logistic Curve | Census Enumerations |
|---|---|---|
| 1400 | 8,542,154 | |
| 1500 | 17,949,979 | |
| 1600 | 37,069,615 | |
| 1650 | 52,667,737 | |
| 1700 | 73,966,778 | |
| 1750 | 102,269,842 | |
| 1800 | 138,550,406 | |
| 1850 | 182,970,279 | |
| 1872 | 204,856,478 .. | 206,162,360 |
| 1881 | 214,164,765 .. | 209,254,795 |
| 1891 | 224,721,920 .. | 229,343,255 |
| 1900 | 234,397,469 | |
| 1901 | 235,481,847 .. | 232,554,061 |
| 1911 | 246,418,715 .. | 247,437,521 |
| 1921 | 257,504,640 .. | 250,406,771 |
| 1931 | 268,710,238 .. | 276,949,889 |
| 1950 | 290,219,936 | |
| 2000 | 346,728,616 | |
| 2050 | 400,030,162 | |
| 2100 | 447,064,940 | |
| 2150 | 486,183,200 | |
| 2200 | 517,149,942 | |
| 2250 | 540,718,685 | |
| 2300 | 558,125,621 | |
| 2350 | 570,698,295 | |
| 2400 | 579,633,812 | |
| 2500 | 590,286,888 | |
| 2600 | 595,411,107 | |
| Limit | 600,000,000 | |

## ANNUAL BIRTHS AND CRUDE BIRTH-RATE

In order to deduce the trend of annual births in a logistic population Lotka made use of the relation

$$N(t) = \int_0^\infty B(t-a) \, . \, p(a)da \quad . \quad . \quad . \quad . \quad (1)$$

where $N(t)$ is the total number of persons living at any time $t$. $B(t)$ is the number born at time $t$, "$a$" represents age and $p(a)$ denotes the probability of living up to age "$a$." The relation (1) therefore shows that the total number of persons living at any time $t$ is the sum of the survivors to every age "$a$" of $B(t-a)da$

persons born at time $(t - a)$ in a small interval of time $da$. In a logistic population we further have

$$N(t) = \frac{N_u}{1 + e^{-rt}}$$

where $N_u$ is the upper asymptote, $e$ is the exponential base, $r$ is a constant, and the origin is taken at the point of inflexion. We therefore have the following relationship connecting the total population at any time with those born at different times.

$$\frac{N_u}{1 + e^{-rt}} = \int_0^\infty B(t - a) \,.\, p(a)da \qquad . \quad . \quad . \quad (2)$$

With the help of this relation Lotka solved in general the puzzling problem which Yule (1925) had described as follows: “What would be the course of birth- and death-rates if the population had been following the logistic for indefinite period in the past prior to the epoch $-4$[1]?” At another place he says: “I see no general method of effectively attacking this problem at present and have contented myself with working out a couple of cases as illustrations.” In working out these illustrations Yule made an assumption regarding the age-distribution of the logistic population. No such hypothesis is in fact necessary and it will be shown later that the age distribution can be entirely determined from the relation (2) given above. This equation is the basis for determining an expression for $B(t)$.

It is not necessary to describe the method by which Lotka has solved this relation. Suffice it to say that for our purpose the births can be expressed in terms of an infinite series involving hyperbolic tangents as follows:

$$\begin{aligned} B(t) = \frac{N_u}{L_0}\Biggl[\Biggl(&\tfrac{1}{2}+\tfrac{1}{2}\tanh\frac{r(t+\mu_1)}{2}+\frac{\mu_2 r^2}{2!\,4} \\ &\times\left\{\tanh\frac{r(t+\mu_1)}{2}-\tanh^3\frac{r(t+\mu_1)}{2}\right\}-\frac{\mu_3}{3!}\cdot\frac{r^3}{8} \\ &\times\left\{1-4\tanh^2\frac{r(t+\mu_1)}{2}+3\tanh^4\frac{r(t+\mu_1)}{2}\right\}-+-\ldots\Biggr] \quad . \quad (3) \end{aligned}$$

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[1] The unit of this measurement is his standard interval, which is about fifty years.

$$\text{where} \quad L_0 = \int_0^\infty p(a)da$$

$$\mu_1 = \int_0^\infty p(a) \,.\, a \, da \Big/ \int_0^\infty p(a) \, da$$

and $\mu_2$, $\mu_3$ . . . are all functions of age and the probabilities of survival.

The relationship (3) therefore provides us with an expression for births in a logistic population.

It may be noted that in addition to the constants which have been calculated for the equation of the logistic curve the equation for annual births involves certain other numerical estimates which are based on the life-tables. With increasing time it is natural to suppose that the life-tables will gradually vary. But we may, in the first instance, calculate the trend of annual births on the assumption that the life-tables remained constant. In what follows the estimates have been based on the 1931 All-India life-table for males. It may be stated that no material difference arises by using a life table for females in place of that of males.

The expression (3) for the births has been given in terms of an infinite series. But Lotka has shown that in actual practice the terms involving $\mu_2$, $\mu_3$, and so on, are on almost insignificant, so that only the first two terms in brackets may be considered sufficient for the calculation of annual births. He has called these terms the fundamental component.

The numerical values of the constants entering in this equation as calculated from the 1931 All-India life table for males are

$$L_0 = 26{\cdot}91$$
$$L_1 = 26{\cdot}785{,}4671$$
$$\mu_1 = 0{\cdot}958{,}2113$$

and therefore,

$$B(t) = 11{,}148{,}272 + 11{,}148{,}272 \tanh (0{\cdot}003{,}7930\, t + 0{\cdot}003{,}6345)$$

The table on page 109 gives the annual births calculated from this equation.

The trend demonstrated by this fundamental component is diagrammatically represented in Fig. 3.

The curve takes the shape similar to that of a logistic. The lower asymptote corresponds to a vanishingly small number of births and the upper to a stationary birth-rate which would be attained when the ultimate population has been reached. For the year 1931 the number of annual births given by the fundamental component is 10,025,592, corresponding to a population of 268,710,238.

TABLE V.—ANNUAL BIRTHS CALCULATED FROM THE FUNDAMENTAL COMPONENT

| Year | Calculated Births | Year | Calculated Births |
|---|---|---|---|
| 1600 | 1,387,004 | 2050 | 14,901,443 |
| 1650 | 1,970,242 | 2100 | 16,643,983 |
| 1700 | 2,766,287 | 2150 | 18,091,443 |
| 1750 | 3,823,459 | 2200 | 19,236,922 |
| 1800 | 5,177,540 | 2250 | 20,107,919 |
| 1850 | 6,833,767 | 2300 | 20,750,887 |
| 1900 | 8,749,033 | 2350 | 21,215,124 |
| 1950 | 10,825,288 | 2400 | 21,544,979 |
| 2000 | 12,924,212 | Limit | 22,296,544 |

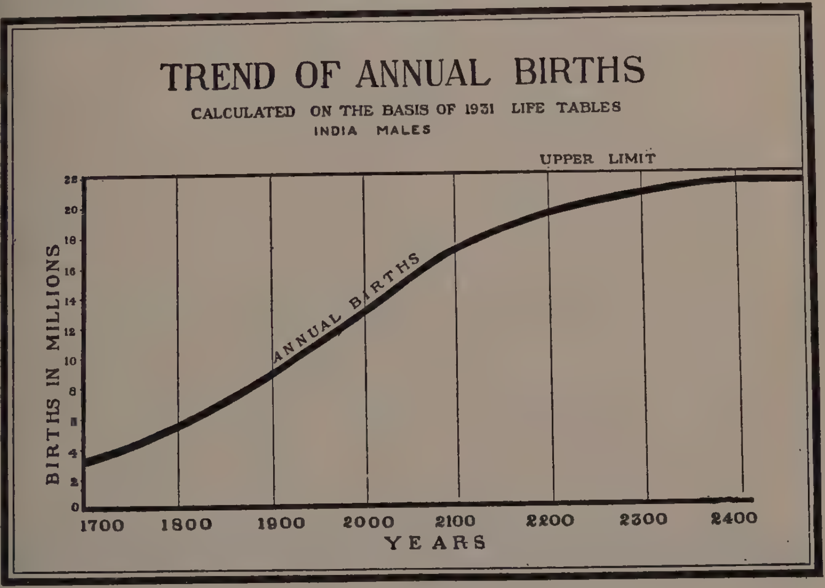

FIG. 3

The population under registration in that year was (P.H.C.'s report, 1931), 265,716,405 and therefore on this population we proportionately expect 9,913,893 births. The births actually recorded by the Public Health Commissioner were 9,135,890, which therefore gives an error of 7·8 per cent of the expected births. When it is remembered that the percentage error of omission in vital statistics registration can be as high as 13·2 per cent (P.H.C.'s report, 1933), a deviation of 7·8 per cent may not be considered large.

If these annual births are related to the yearly populations we get the trend of the birth-rates. The last column of Table VI shows the birth-rates per mille at intervals of fifty years.

TABLE VI.—BIRTH-RATES PER MILLE IN THE LOGISTIC POPULATION

| Year | Births | Population | Birth-Rate per Mille |
|---|---|---|---|
| 1600 | 1,387,004 | 37,069,615 | 37·416 |
| 1650 | 1,970,242 | 52,667,737 | 37·409 |
| 1700 | 2,766,287 | 73,966,778 | 37·399 |
| 1750 | 3,823,459 | 102,269,842 | 37·386 |
| 1800 | 5,177,540 | 138,550,406 | 37·369 |
| 1850 | 6,833,767 | 182,970,279 | 37·349 |
| 1900 | 8,749,033 | 234,397,469 | 37·326 |
| 1950 | 10,825,288 | 290,219,936 | 37·300 |
| 2000 | 12,924,212 | 346,728,616 | 37·275 |
| 2050 | 14,901,443 | 400,030,162 | 37·251 |
| 2100 | 16,643,983 | 447,064,940 | 37·229 |
| 2150 | 18,091,783 | 486,183,200 | 37·211 |
| 2200 | 19,236,922 | 517,149,942 | 37·198 |
| 2250 | 20,107,919 | 540,718,685 | 37·187 |
| 2300 | 20,750,887 | 558,125,621 | 37·180 |
| 2350 | 21,215,124 | 570,698,295 | 37·174 |
| 2400 | 21,544,979 | 579,633,812 | 37·170 |
| Limit | 22,296,544 | 600,000,000 | 37·161 |

Here we come to an interesting finding. The figures show that the birth-rate is more or less constant, showing only an insignificantly small decline from 37·416 per mille to 37·170 over a period of 800 years. This decline, small as it is, is not linear. If the scale of the whole diagram is sufficiently enlarged, it is seen (Fig. 4) that the birth-rates follow a course which resembles an inverted logistic.

In the case of America Lotka found that on the basis of 1919–20 life-table the birth-rate showed a drop from 41·9 per mille to 17·4 over a period of 1700 to 2100. In the following Fig. 5 a comparison is made between the birth-rate curves for America and India on the assumption of fixed life-tables.

Thus, on the assumption of a fixed life-table a constant birth-rate may be considered a feature of the Indian population.

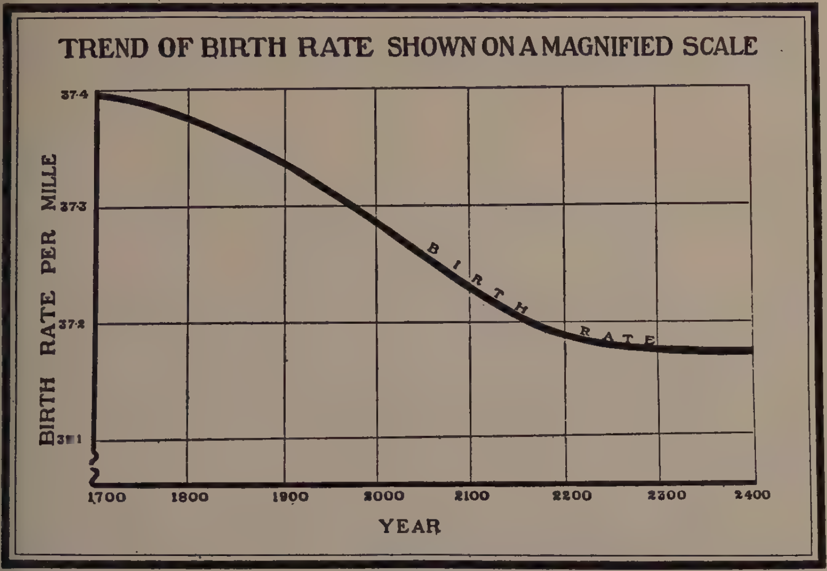

FIG. 4

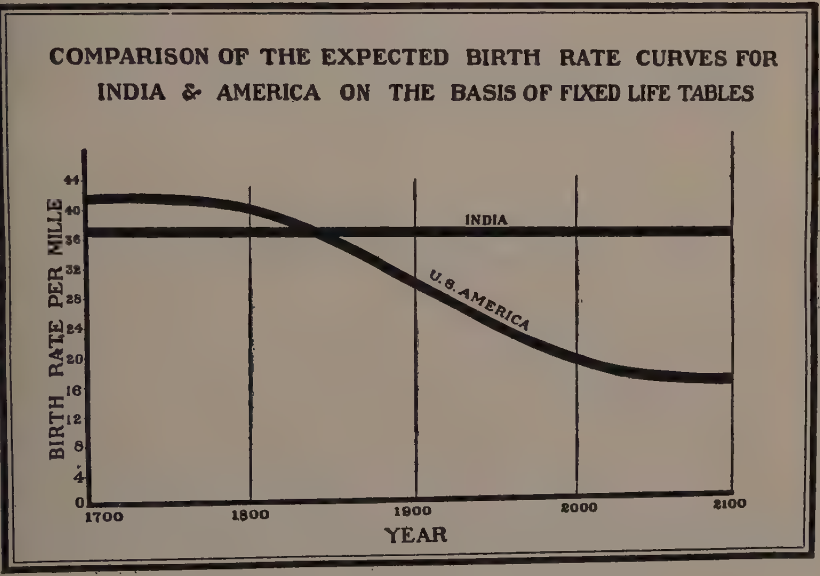

FIG. 5

The actual birth-rates for India from 1865 onwards have been plotted by Carr-Saunders (1936). It may be seen from Fig. 6 that the expected values of Table VI fairly describe the actual birth-rates. Disagreement is mainly seen from about 1919 onwards.

It will be shown later that this is due to the fact that a fixed life-table has been supposed to describe the conditions over a long range of time. The agreement is very much improved when allowance is made for changing mortality conditions.

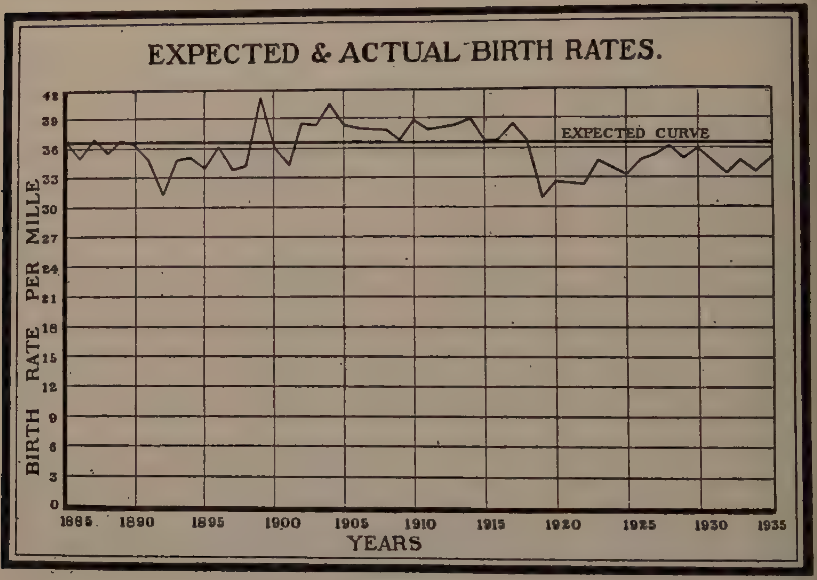

Fig. 6

DEATH-RATES

The rate of population increase can be calculated from the logistic curve. The death-rate can, therefore, be found by subtracting from the birth-rate the rate of increase of population. The following table gives the death-rates calculated on the basis of 1931 life-table.

TABLE VII.—Death-Rates in Logistic Population (India)

| Year | Death-Rates per Mille | Year | Death-Rates per Mille |
|---|---|---|---|
| 1600 | 29·000 | 2000 | 34·200 |
| 1650 | 29·321 | 2050 | 34·899 |
| 1700 | 29·746 | 2100 | 35·479 |
| 1750 | 30·291 | 2150 | 35·937 |
| 1800 | 30·957 | 2200 | 36·287 |
| 1850 | 31·728 | 2250 | 36·543 |
| 1900 | 32·563 | 2300 | 36·729 |
| 1950 | 33·406 | 2350 | 36·361 |

It is interesting to note that if the logistic law be supposed to hold good the death-rate is bound to rise. This is due to the fact that with increasing time the population tends to become more and more aged, i.e. the mean age of the population increases. It has to be remembered that one important assumption which is implied is that the mortality rates at various ages remain stationary. But it has already been stated that the health conditions are bound to improve, with the result that mortalities at all ages are likely to decline. Raja (1937) has shown that during the last ten years this has actually been the case for males as well as for females. The only age which has shown a rise in specific mortality rate is the Group 60 and over, but the size of this group is so small that it may be considered to be negligible. The death-rates in Table VII therefore need correction for improvement in health conditions. In another section it will be shown that when this correction is applied the expected death-rates can fairly represent the trend of actual mortality.

## AGE DISTRIBUTION

It is of interest to see how the age distribution changes from time to time in a population growing under the logistic law. The age distribution can be calculated from the annual births. $B(t)$ and the survival function $p(a)$ as follows.

If $n(a, t)$ denote the number of persons aged "$a$" at time $t$ then $n(a, t) = B(t - a)\, p(a)$.

The proportion of persons at age $a$ is then given by the relation $n(a, t)/N(t) = C(a)$. The survival function has again been taken from the life-table for males 1931. The values obtained for persons at various ages are shown in Table VIII.

The trends of populations at various ages are shown in the three-dimensional diagram, Fig. 7.

When each of the cell values of Table VIII are divided by the corresponding total population we get figures for age distribution which are comparable with each other. Table IX shows the variation in the age-distribution through the period 1700 to 2400.

From Table IX it is not easy to see what changes have taken place in the age distributions during the period covered by this table. In Fig. 8 this point is clearly brought out.

It will be seen that in India very little variation in the age distribution of the population is expected. The shaded areas at the

## TABLE VIII.—CALCULATED POPULATIONS AT VARIOUS AGES FOR THE PERIOD 1700–2400

| YEARS | AGES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 1700 | 2,766,287 | 1,472,139 | 1,253,382 | 1,005,431 | 736,002 | 489,715 | 276,797 | 122,212 | 24,531 | 256 | — |
| 1750 | 3,823,459 | 2,039,602 | 1,741,204 | 1,401,028 | 1,029,190 | 673,536 | 389,315 | 172,232 | 34,650 | 362 | — |
| 1800 | 5,177,540 | 2,770,680 | 2,373,723 | 1,917,628 | 1,415,104 | 930,936 | 539,384 | 239,266 | 48,284 | 506 | — |
| 1850 | 6,833,767 | 3,671,779 | 3,159,878 | 2,565,583 | 1,904,001 | 1,260,627 | 732,721 | 326,182 | 66,087 | 696 | — |
| 1900 | 8,749,033 | 4,724,018 | 4,087,498 | 3,338,701 | 2,494,350 | 1,663,886 | 971,022 | 434,211 | 88,418 | 936 | — |
| 1950 | 10,825,288 | 5,878,236 | 5,117,630 | 4,208,386 | 3,167,451 | 2,130,215 | 1,249,292 | 561,679 | 115,062 | 1,227 | — |
| 2000 | 12,924,212 | 7,060,875 | 6,187,699 | 5,124,488 | 3,886,634 | 2,635,741 | 1,554,531 | 703,233 | 145,034 | 1,557 | — |
| 2050 | 14,901,443 | 8,191,101 | 7,225,025 | 6,025,182 | 4,603,673 | 3,146,787 | 1,867,286 | 850,275 | 176,606 | 1,911 | — |
| 2100 | 16,643,983 | 9,201,566 | 8,165,326 | 6,852,559 | 5,270,841 | 3,628,203 | 2,166,181 | 992,818 | 207,647 | 2,264 | — |
| 2150 | 18,091,783 | 10,052,381 | 8,967,009 | 7,566,281 | 5,852,740 | 4,052,477 | 2,433,403 | 1,122,029 | 236,161 | 2,592 | — |
| 2200 | 19,236,922 | 10,733,188 | 9,615,343 | 8,149,129 | 6,332,222 | 4,404,987 | 2,658,406 | 1,232,191 | 260,758 | 2,879 | — |
| 2250 | 20,107,919 | 11,255,973 | 10,117,467 | 8,604,027 | 6,709,066 | 4,683,806 | 2,838,449 | 1,321,281 | 280,845 | 3,115 | — |
| 2300 | 20,750,887 | 11,644,690 | 10,493,389 | 8,946,595 | 6,994,346 | 4,895,876 | 2,976,702 | 1,390,280 | 296,522 | 3,300 | — |
| 2350 | 21,215,124 | 11,927,116 | 10,767,699 | 9,197,650 | 7,204,220 | 5,052,426 | 3,079,527 | 1,441,937 | 308,328 | 3,440 | — |
| 2400 | 21,544,979 | 12,165,803 | 10,964,117 | 9,377,980 | 7,355,385 | 5,165,458 | 3,154,189 | 1,479,631 | 316,978 | 3,543 | — |

TABLE IX.—CALCULATED VALUES AT VARIOUS AGES PER MILLE OF THE TOTAL POPULATION

| YEARS | AGES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 1700 | 37·399 | 19·903 | 16·945 | 13·593 | 9·950 | 6·486 | 3·742 | 1·652 | 0·332 | 0·003 | — |
| 1750 | 37·386 | 19·943 | 17·026 | 13·699 | 10·063 | 6·586 | 3·806 | 1·684 | 0·339 | 0·004 | — |
| 1800 | 37·369 | 19·998 | 17·133 | 13·841 | 10·214 | 6·719 | 3·893 | 1·727 | 0·384 | 0·004 | — |
| 1850 | 37·349 | 20·068 | 17·270 | 14·022 | 10·406 | 6·890 | 4·005 | 1·783 | 0·361 | 0·004 | — |
| 1900 | 37·326 | 20·154 | 17·438 | 14·244 | 10·642 | 7·099 | 4·143 | 1·852 | 0·377 | 0·004 | — |
| 1950 | 37·300 | 20·254 | 17·634 | 14·501 | 10·914 | 7·340 | 4·305 | 1·935 | 0·396 | 0·004 | — |
| 2000 | 37·275 | 20·364 | 17·846 | 14·780 | 11·209 | 7·602 | 4·483 | 2·028 | 0·418 | 0·004 | — |
| 2050 | 37·251 | 20·476 | 18·061 | 15·062 | 11·508 | 7·866 | 4·668 | 2·126 | 0·441 | 0·005 | — |
| 2100 | 37·229 | 20·582 | 18·264 | 15·328 | 11·790 | 8·116 | 4·845 | 2·221 | 0·464 | 0·005 | — |
| 2150 | 37·212 | 20·676 | 18·444 | 15·563 | 12·038 | 8·335 | 5·005 | 2·308 | 0·486 | 0·005 | — |
| 2200 | 37·198 | 20·754 | 18·593 | 15·758 | 12·244 | 8·518 | 5·140 | 2·383 | 0·504 | 0·006 | — |
| 2250 | 37·187 | 20·817 | 18·711 | 15·912 | 12·408 | 8·662 | 5·249 | 2·444 | 0·519 | 0·006 | — |
| 2300 | 37·180 | 20·864 | 18·801 | 16·030 | 12·532 | 8·772 | 5·333 | 2·491 | 0·531 | 0·006 | — |
| 2350 | 37·174 | 20·899 | 18·868 | 16·116 | 12·624 | 8·853 | 5·396 | 2·527 | 0·540 | 0·006 | — |
| 2400 | 37·170 | 20·989 | 18·916 | 16·179 | 12·690 | 8·912 | 5·442 | 2·553 | 0·547 | 0·006 | — |

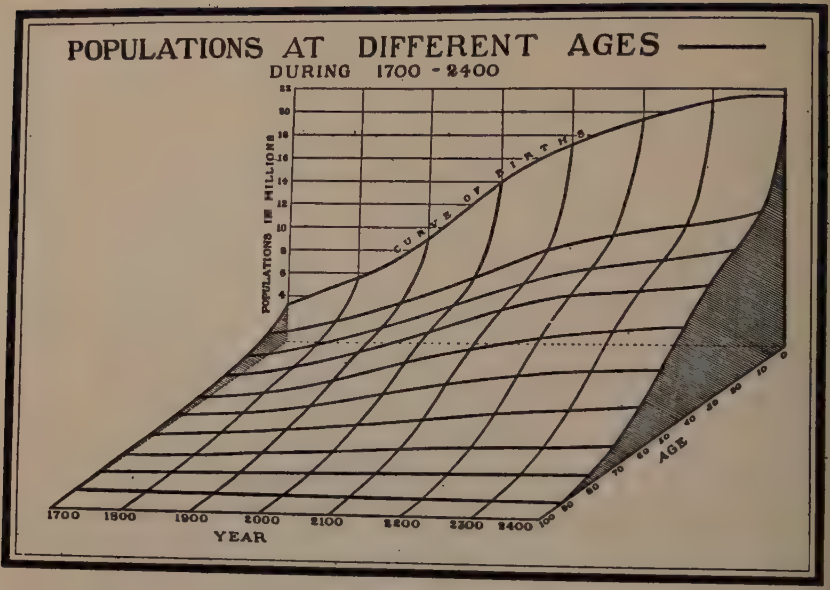

FIG. 7

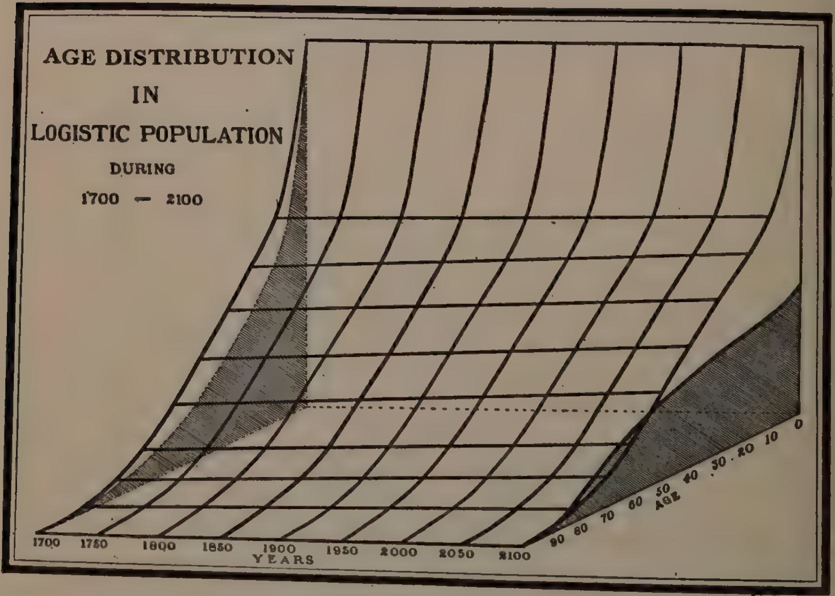

FIG. 8

two extremes depict the age distributions as calculated by Lotka for America. In that country there is a clear tendency for a shift towards higher ages. The age distributions are very similar in

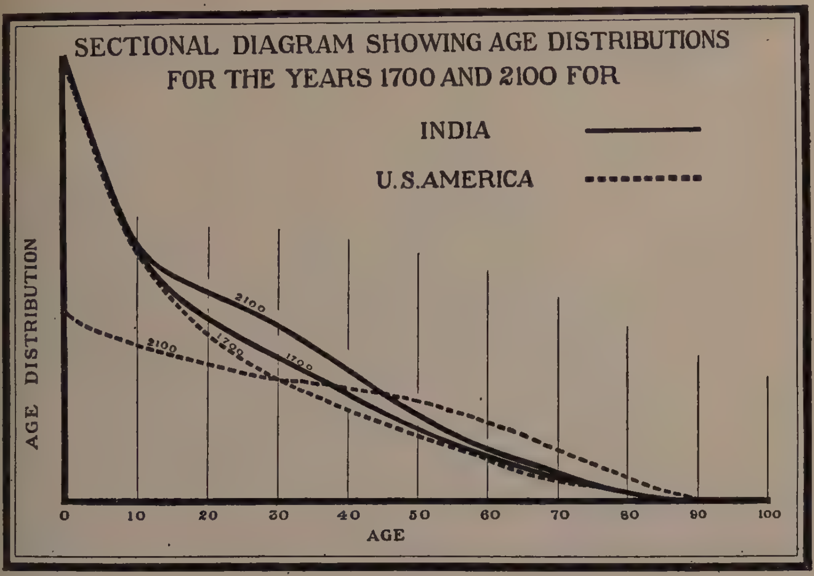

FIG. 9

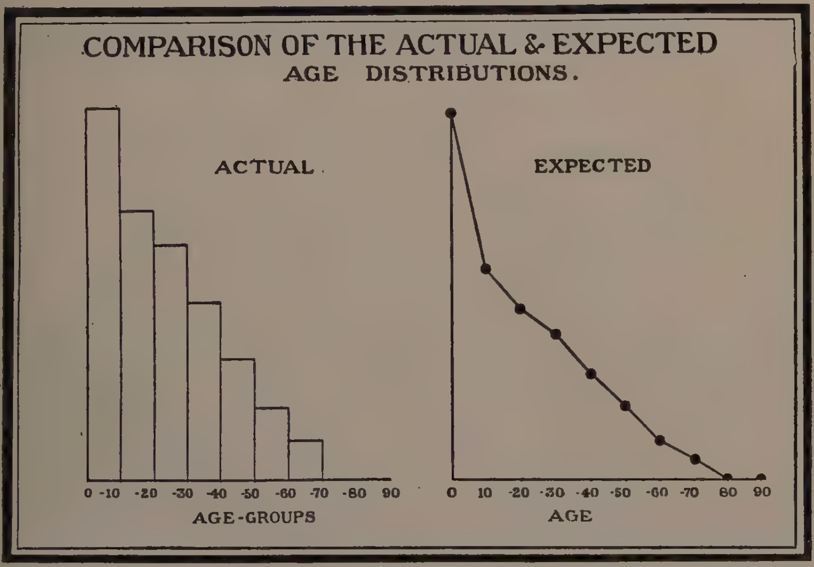

FIG. 10

both countries in the beginning. They start with a very high proportion of children and the curves are J shaped. At the year 2100 they exhibit considerable divergence. These differences are more clearly brought out in Fig. 9, which is a side elevation of the model presented in Fig. 8.

For purposes of comparison with the actual, the expected age distribution for 1931 is obtained by interpolation from the previous table. Figure 10 shows a comparison, in form, of the actual and the expected age distributions. The actual distribution is given in terms of the age groups, whereas for the theoretical age distribution we have values for only a few selected ages. The diagrams, however, are sufficient to bring out the similarity between the actual and expected distributions.

## THE EFFECT OF VARYING LIFE-TABLES ON FUTURE TRENDS OF BIRTH- AND DEATH-RATES

As already explained, the results so far presented are based on a fixed life-table (India, males, 1931). Calculations on similar lines for trends of natality and mortality rates were calculated on the basis of 1901–11 life-tables (males) for India, and 1931 for England and Wales (males). No life-tables for 1921 had been prepared for India. The calculated birth-rates are given in Table X.

TABLE X.—Birth-Rates Calculated from Different Life-Tables

| Year | Life-Tables for Males for— | | | |
|---|---|---|---|---|
| | India, 1901 | India, 1911 | India, 1932 | England and Wales, 1931 |
| 1600 | 42·638 | 44·610 | 37·416 | 17·096 |
| 1700 | 42·617 | 44·587 | 37·399 | 17·091 |
| 1800 | 42·580 | 44·547 | 37·369 | 17·083 |
| 1900 | 42·525 | 44·488 | 37·326 | 17·071 |
| 2000 | 42·461 | 44·420 | 37·275 | 17·056 |
| 2100 | 42·405 | 44·359 | 37·229 | 17·043 |
| 2200 | 42·365 | 44·317 | 37·198 | 17·035 |
| 2300 | 42·342 | 44·292 | 37·180 | 17·029 |
| 2400 | 42·330 | 44·280 | 37·170 | 17·027 |
| Limit | 42·319 | 44·267 | 37·161 | 17·024 |

It will be observed that in each case the trend lines are almost linear but they are at different levels depending upon the mortality conditions expressed by the life-tables on which they are based. The important point to note is that the better the mortality condition the lower is the level of these trend lines. As has been stated before, mortality conditions in India exhibit a tendency to improve. The result of such an improvement will be the shifting of the birth-rate to a lower level. This explains the slight disagreement between the actual and the expected birth-rates seen in Fig. 6. One may perhaps imagine that if this improvement in mortality conditions in India continued, it might approximate at some future date the conditions which obtained in England and Wales in 1931. A trend of birth-rates in India under such circumstances will take a downward course depending upon the rate of improvement of mortality conditions. The course of such a curve is represented in Fig. 11 in a hypothetical case when mortality conditions in India will approximate those in England (1931) 100 years hence.

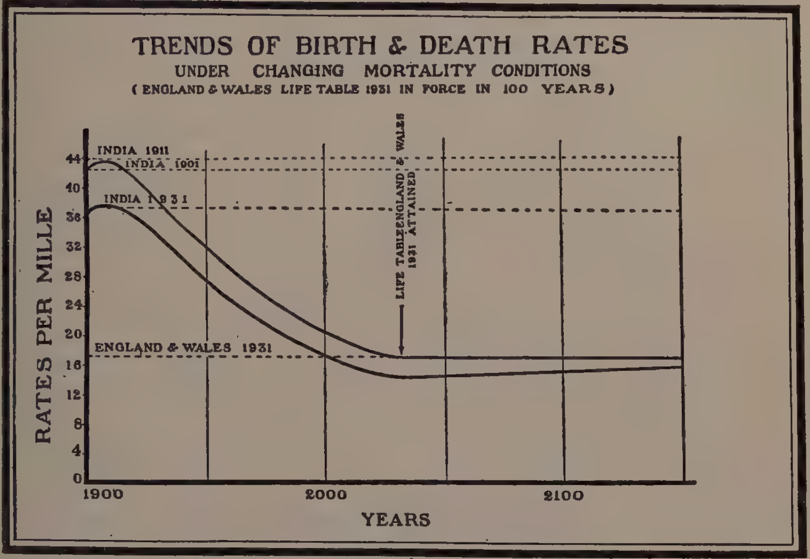

FIG. 11

In the same diagram will be seen a curve of death-rates which has been calculated from this birth-rate curve and the rate of population increase. The important feature of these curves is that from the point at which it is assumed that no further improvement in mortality rates occurs the birth-rate, which is showing slight decline and the death-rate which is rising naturally, tend to approach each other.

## SUMMARY

So far logistic law of growth has mainly been applied to the study of the population growths of various countries. Lotka has shown how certain other demographic characteristics of a population, which has been subjected to logistic law of growth for a considerable period of time, may be studied.

The applicability of the logistic law to Indian population has been discussed. The trends of birth- and death-rates as well as of age distributions have been calculated on the basis of Lotka's deductions, and it has been shown that they give fairly good fits to actual happenings. It has further been indicated that improvement in mortality conditions will lower the level of the birth-rate trends, and if and when the factors responsible for these improvements have ceased to operate the birth- and death-rate curves will tend to approach each other.

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# INTERNATIONAL POPULATION CONGRESS, PARIS, 1937

UNDER the aegis of the International Union for the Scientific Investigation of Population Problems a most successful Congress was held in Paris from July 29 to August 1, 1937. There was gathered together a large number of demographers and sociologists from all parts of the world. Monsieur Zay, the Minister for Education, presided over the inaugural session, which was graced by the presence of Monsieur Lebrun, the President of the French Republic. There were interesting discussions at the two plenary sessions, and the delegates to the Congress were busy reading and listening to the many communications, which were organized in sections. The Proceedings of the Congress are at the present moment in the process of being printed.

We are indebted to our French hosts for the excellence of the arrangements, for the choice of the *locus* of the Congress, the new Maison de la Chimie, and for their kindness and good nature in the organization of the social life of the reunion.

*Political Arithmetic—A Symposium of Population Studies.* Edited by LANCELOT HOGBEN. 530 pp. Allen & Unwin. London. 1938. Price 30s. net.

This book contains work written by a variety of authors. The first chapter, by Dr. R. R. Kuczynski, on the international decline in fertility, contains many statistical data on fertility in various European countries and Australia and New Zealand, Canada, the United States, and Japan. He traces the trends in reproduction over the past fifty or sixty years, and concludes that the decisive factor on the trend of future net reproduction of the territories "comprised by Western civilization" is the trend of matrimonial fertility. Lower mortality will not suffice to increase this measure of population change.

The next chapter, on the effect of present trends in fertility and mortality upon the future population of Great Britain and upon its age composition, is by Dr. Enid Charles. This contains estimates for one hundred years ahead of the present time, and shows to what levels population is likely to decline on the assumption of present tendencies.

The next chapter, by Dr. Enid Charles and Dr. Pearl Moshinsky, is on the differential fertility in England and Wales during the past two decades. The gross reproduction rates have been worked out for each county, distinguishing urban parts and rural parts, and for each county borough and the London boroughs. These figures are related to the proportion of women occupied in the various regions and to occupations in the various regions. The authors conclude that there is a definite correlation between low fertility and a high percentage of employed women. The mining and metal industries and agriculture, to a lesser degree, are associated with higher fertility.

In Chapter IV, Mr. D. V. Glass writes on changes in fertility in England and Wales over the past eighty years. He has considered the registration counties as units, and notes for any year a relationship between fertility and a number of factors—marriage, women's employment, and occupation, conclusions similar to those reached in the previous chapter. But he does not find that changes in these factors with time are significantly responsible for decline in fertility. The suggestion is that there were in operation forces not so far taken into account which acted generally throughout the country.

A chapter by Dr. Charles on the changing structure of the family in Australia follows.

Then comes a chapter by Mr. Glass on marriage frequency and economic fluctuations in England and Wales from 1851 to 1934. In this the short-term changes in marriage rates and real wages are shown to be related. Perhaps the most significant part of this study is that relating to the long-term changes in these two series, which involves other factors to which Mr. Glass referred in his previous chapter.

An interesting chapter by Dr. Kuczynski on British demographers' opinions on fertility, 1660–1760, follows. The final words of this chapter throw an interesting sidelight on the opinions of these notabilities of that century: "To encourage matrimony and to hinder intemperance and licentiousness seemed to them the best and practically the only means of promoting fertility." This may be contrasted with present-day opinions of those immediately concerned with the problem, where the emphasis is laid on economic and social conditions and the dread of war.[1]

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[1] *The Population Problem*, Allen & Unwin, 1938.

In the second part of the book there is an interesting chapter by Mr. J. L. Gray and Dr. Moshinsky on "Ability and Opportunity in English Education." They have tested a large number of elementary schoolchildren in London, and assigned to each an intelligence quotient. Similar tests were made of children in secondary, private, and preparatory schools. These results, when compared, show the extent to which higher education in England is determined by means rather than ability. "Taking children of equally high ability, seven fee-paying pupils will receive a higher education for every one free pupil."

Another chapter by the same authors on "Ability and Educational Opportunity in Relation to Parental Occupation" continues the previous work. The previous results are related to parental occupation and status.

The next chapter, by Mr. Glass and Mr. Gray, deals with opportunities to enter Oxford and Cambridge. It appears that at the present time roughly one-eighth of the undergraduate population of these two universities consists of ex-elementary schoolboys. A most comprehensive set of statistics is included in this chapter, where different types of schools are considered in relation to recruitment of the universities. Apparently the poorer classes are not the only sufferers, as far as the chance of a university education at one of the older universities is concerned. The most expensive public schools get the majority of the scholarships.

Finally, the book concludes with a chapter by Dr. Charles and Mr. David Morgan on initial and maximum earnings and differential fertility of skilled and unskilled wage-earners, and a chapter on the distribution of blood-groups and its bearing on the concept of race by Allison Davis.

In the Introduction the editor pleads for facts and the analysis of facts rather than theories. Many of the facts relating to population studies are statistics. In this book there is a wealth of statistical material, arranged and analysed. It is to be hoped that these studies will continue. Many of the problems are nowadays well known. Some have been considered previously. Some are here dealt with in a different and more refined manner than before. Some of the studies are new in the sense that they call attention to a situation with the aid of actual figures rather than by means of vague generalizations. Perhaps the theorists may be tempted to explain some of the facts contained in this book.

E. C. R.